NETWORK WORLD

The Newsweekly of User Networking Strategies

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HP extends NewWave out across LANs

By Susan Breidenbach
West Coast Bureau Chief

CUPERTINO, Calif. — Hewlett-Packard Co. last week raised office automation to a new level with the announcement of a suite of software products that make applications running on different machines work together as if they had been designed to cooperate.

Called NewWave Office, the software essentially extends HP's existing NewWave product across corporate networks. NewWave is an object-oriented environment for DOS-based personal computers that runs on top of Microsoft Corp.'s Microsoft Windows.

An "object," represented by an icon on a user's workstation, could be a compound document consisting of information stored on several different systems. To call up the document, a user just clicks on the icon. This triggers a background NewWave "agent" that goes around the network collecting the document's constituent components and assembling them.

According to Ann Palermo, director of work group application systems research at International Data Corp. in Framingham, Mass., NewWave vaults HP ahead of Digital Equipment Corp. and IBM, with their All-In-1 and OfficeVision products, respectively.

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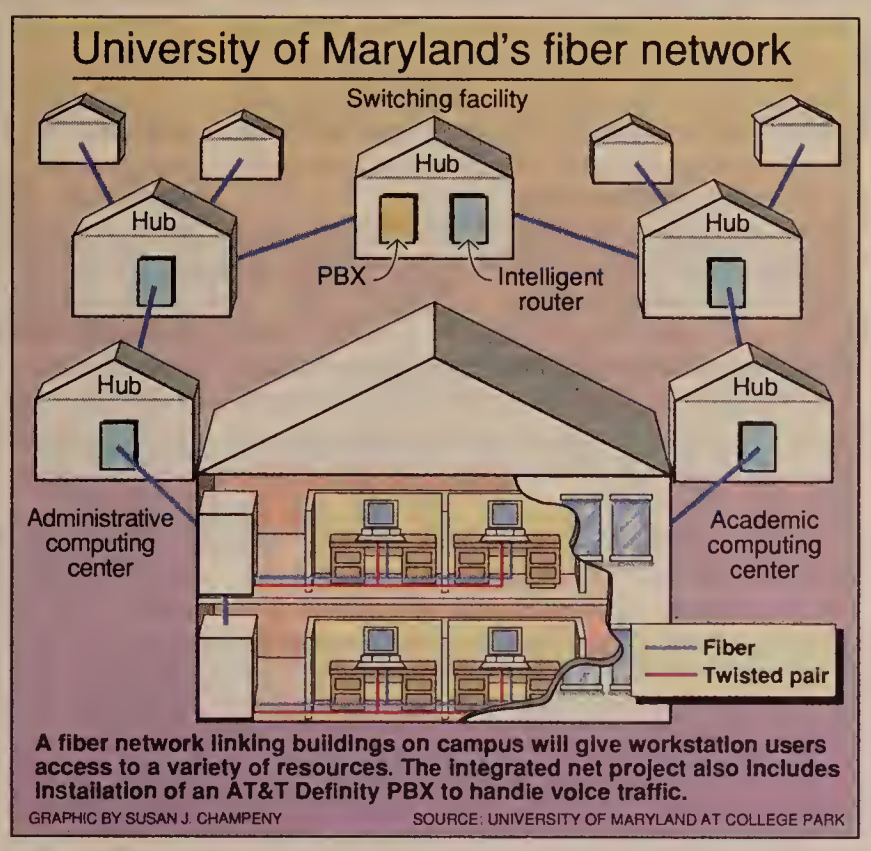

A fiber network linking buildings on campus will give workstation users access to a variety of resources. The integrated net project also includes installation of an AT&T Definity PBX to handle voice traffic.

GRAPHIC BY SUSAN J. CHAMPENY | SOURCE: UNIVERSITY OF MARYLAND AT COLLEGE PARK

University builds network foundation for the future

Univ. of Maryland guts old network for leading-edge voice/data/video communications system.

By Wayne Eckerson
Senior Writer

COLLEGE PARK, Md. — The University of Maryland at College Park is replacing its antiquated network facilities with a state-of-the-art net supporting advanced voice, data and video communications capabilities.

The $32 million project, scheduled for completion this summer, involves construction of a fiber-optic data network, installation of a new PBX and a massive rewiring effort. The new network is designed to give the school an edge in supporting advanced research and development, according to Jonathan Rood, director of communications services at the university.

The radical network makeover will ultimately save the university money by eliminating the need for costly upgrades to support emerging communications technologies, such as Fiber Distributed Data Interface (FDDI), in the future.

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FCC orders RBHCs to end strategic pricing

In a victory for users, agency bars controversial special-access pricing practice, orders refunds.

By Anita Taff
Washington Bureau Chief

WASHINGTON, D.C. — In a major policy reversal, the Federal Communications Commission last week voted unanimously to prevent the regional Bell holding companies from strategically pricing special-access services.

In October 1988, the FCC ruled that the RBHCs could use strategic pricing — pricing based on factors other than the cost of providing service — to achieve certain objectives, such as discouraging bypass of the public network.

Last week, four years after the first suspect tariffs were filed, the FCC said strategic pricing would no longer be tolerated. It said market conditions no longer exist that would cause corporate customers to abandon switched services en masse.

The agency ruled that the practice has resulted in inflated private-line fees and ordered seven local carriers to refund up to $75 million in overcharges.

The settlement ends years of bitter battling among the FCC, local carriers and users groups, such as the International Communications Association (ICA), which applauded the decision. ICA Counsel Brian Moir said the action will prevent the RBHCs from overcharging for special access in the future.

The message from previous FCC regulators and the RBHCs

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SOURCE: TDCC/EDIA, ALEXANDRIA, VA., AND GARTNER GROUP, INC., STAMFORD, CONN.
GRAPHIC BY SUSAN SLATER

N.Y. widens options for local access

By Barton Crockett
Senior Editor

NEW YORK — The New York Public Service Commission (PSC) last week approved a tariff that will, for the first time, let alternate carriers provide local-access lines to New York Telephone Co.'s central office switches.

Besides allowing alternative carriers to connect their own fiber-optic cables to New York Telephone switches, the Optical Transport Interconnection Service (OTIS) will provide higher speed access to switches, giving bypass carriers needed economies to compete for local access.

To allow New York Telephone to keep abreast of the extra competition this arrangement is expected to generate, the New York PSC also gave the carrier freedom to increase certain rates for dedicated lines and to decrease others, as long as total rev-

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NETLINE

NEWSPAPER

FEATURE

The lowdown on the new Bush FCC lineup

By Alan Pearce
Special to Network World

President Bush has already placed his stamp squarely on the Federal Communications Commission — both in style and substance.

In style, the new Bush appointees — Chairman Alfred Sikes and Commissioners Andrew Barrett and Sherrie Marshall — are open, accessible, nonideological consensus builders. The new senior staffers reflect their chairman's conciliatory spirit.

The Sikes commission wants to build an "irreversible momentum" to usher in the long-awaited information age. Succinctly summarizing his own policy-making objective, Chairman Sikes says, "If General Electric or General Motors want a particular communications or information technology today, they go buy it; they set up private networks. There is the opportunity for us to get that for

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U. of California teams up with DEC to build OSI net

Joint project will be based on DECnet Phase V, may eventually support SNA, TCP/IP protocols.

By Paul Desmond
Senior Writer

SAN DIEGO — The University of California last week announced a joint project with Digital Equipment Corp. to build a network that will serve as an OSI test bed and may eventually be used to integrate the school's DEC, IBM SNA and TCP/IP nets.

The school currently supports IBM Systems Network Architecture and Transmission Control Protocol/Internet Protocol traffic on its nine-campus T-1 net.

Instead of introducing a third proprietary network architecture to support DEC VMS users at two campuses, the school asked DEC to supply it with yet-to-be-released DECnet Phase V products, which are based on Open Systems Interconnection standards.

"The primary purpose [of the joint project] is really just to allow the university and Digital to understand the OSI environment," said Richard West, associate vice-president for information systems and administrative services at the university's Office of the President in Oakland, Calif. "It is a test to see how well the products are developing for OSI, how compatible they really are and how standard they are."

The joint project, announced at the CAUSE '89 education computing conference here last week,

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Vendors emphasize quality in response to competition

New push benefits users by reducing downtime.

By Bob Brown
Senior Editor

The growing strategic importance of networks has made the matter of equipment and service quality a vital issue for users that cannot afford network failure.

In response to the call for high-quality products, vendors are beefing up their commitment to provide defect-free and reliable goods by fine-tuning corporate quality assurance programs. Their goals are to better their competitive stance, improve customer satisfaction and cut costs associated with repairing faulty products.

While cutting through marketing hype can be frustrating, users contacted by *Network World* said comparing vendors' quality assurance practices is worth the effort and they are willing to pay more for a product or service they can rely on.

Marilyn Finn, network manager at Liberty Financial Services, Inc. in Boston, summed it up simply: "If you don't buy quality products, your network will fail."

Al Costanzo, associate director for computer services at Kean College of New Jersey in Union, N.J., agreed. "Quality products and services save money in the long run," he said. "Quality is moving toward the top of the list of buying decision factors."

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Price hike permitted after carrier opens competition

By Barton Crockett
Senior Editor

NEW YORK — Upset by a series of rate changes proposed by New York Telephone Co., attendees at the annual Communications Managers Association conference here last week clamored for greater competition in the local loop.

Sparking discussion was last week's approval of a new tariff that gives New York Telephone the right to increase the amount a user pays for private-line services by as much as 25%, as long as the amount other users pay declines and total private-line revenue at the carrier remains constant.

New York Telephone was given this flexibility as compensation for opening up more competition in the local loop (see "N.Y. widens options for local access," page 1).

Despite the fact that the pricing flexibility is linked with greater competition, several users said they opposed the changes.

"I expect to see prices for some of my dedicated analog lines increase 15% to 100%, while other lines stay the same or decline," said Don Gaffney, vice-president of communications at Fundamental Brokers, Inc., a financial services firm based here. "I think they're trying pretty harshly to push me away from an-

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Briefs

Linking libraries. The University of California and Pennsylvania State University last week said they will team up, under a project sponsored by Digital Equipment Corp., to give users of disparate computers easy access to library data bases at both schools. The project will enable users at the two universities to search the holdings of either school's bibliographic library system using native system commands. To accomplish this, researchers will experiment with ANSI Z39.50, an application-layer protocol for computer-to-computer data retrieval. The protocol permits the separation of user interfaces from their information servers.

The University of California will also use DECwindows as the workstation-based interface to access on-line library catalogs.

Infonet forms int'l EDI alliance. Infonet last week said it has formed a global alliance with six electronic data interchange service providers to link their local EDI services over its value-added network.

Infonet signed Telefonica Spain, Telecom Australia and Railinc of Washington, D.C., among others, to exchange documents over its network with customers on any other alliance member's network.

Via a service dubbed Global Trading Partner Management, Infonet will work with alliance member customers to help bring their trading partners onto the network. Infonet is based in El Segundo, Calif.

Carrier offers financial hot line. Cable & Wireless Communications, Inc. last week launched its Financial Hotline, a dedicated digital point-to-point service that can be used as a regular private line, a voice tie line, an off-premises extension line or a "hoot-and-holler" line, which provides a constant open connection between two sites.

The service, which is targeted at the financial services industry and is available now, was introduced at the Communications Managers Association conference in New York.

Users can buy the service on a monthly basis or under one- and three-year contracts. Under a one-year contract for a New York-to-Chicago link, users would pay a $285 monthly charge and three installation charges: a $400 fee at each end and a $150 interoffice charge. These figures do not include local access fees.

The service is available between New York and the following cities: Boston, Chicago, Dallas, Hartford, Conn., Los Angeles, Philadelphia, San Francisco and Washington, D.C. Financial Hotline also links Chicago to Los Angeles or San Francisco.

US West offers retirement package. In an attempt to cut costs, US West, Inc. last week said it will offer special retirement incentives to about 20,000 of the 22,000 managers in its operating units. The plan includes increased pension payments and accelerated pension availability. US West said it has no estimate of how many managers will accept the offer or what cost the carrier will incur. The plan was developed to rein in costs at a time of growing competition in the telecommunications market, said Dick McCormick, US West's president.

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***Network World* wants you.** If you have a news tip, please contact us. We'd also like to hear about unusual network applications and how you're optimizing your networks for performance or savings. Contact Editor John Gallant at (800) 343-6474, ext. 722, or through MCI Mail at 390-4868.

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Chemical Banking signs Tariff 12 deal with AT&T

If approved, contract will be worth $4m annually.

By Anita Taff
Washington Bureau Chief

WASHINGTON, D.C. — Chemical Banking Corp., the nation's sixth largest bank holding company, late last month became the most recent customer to sign up for an AT&T network package offered under Tariff 12.

The three-year deal, worth a minimum of $4 million annually, is scheduled to become effective in early January, pending regulatory approval from the Federal Communications Commission.

The net will initially support almost all voice and data communications for 28,000 employees at 250 U.S. sites of Chemical Banking and two subsidiaries.

As many as 20 more subsidiaries may be brought onto the network next year, according to John Nastro, senior vice-president of Chemical Banking. The network will also handle international traffic to Chemical Banking's overseas sites.

The new AT&T contract consolidates and replaces services currently purchased from about seven different carriers, Nastro said. It will also provide centralized network management and billing services.

Currently, the telecommunications staff at Chemical Banking has to juggle about 120 separate carrier billing accounts, Nastro said. The new contract brings that number down to five.

By converting to a more streamlined management approach, Nastro expects employee productivity to improve because bills will be easier to understand and analyze. The new network should also enable Chemical Banking to serve its customers better by increasing the availability of network services.

Nastro said the contract with AT&T will result in significant savings on telecommunications costs, though he declined to be more specific.

The primary applications supported on Chemical Banking's backbone network will be automated teller transactions, worldwide securities trading, credit card authorization and data transfers of financial and credit information.

The new network will include 706 voice ports and 150 data lines, including 18 T-1 circuits. AT&T guaranteed that outages of voice and data services will not exceed 0.5% during any 12-month period. If outages exceed 0.5% for two consecutive months, AT&T will credit Chemical Banking 5% of its basic monthly charges — or about $93,000 — for each consecutive month that service falls below the guarantee.

Per-minute prices for on-net domestic calls placed during the day will range from 6.3 cents for a 200-mile call to 13.6 cents for a 5,000-mile call. AT&T has also provided pricing schedules for 101 countries, not including Canada and Mexico, with rates falling between $1 and $2 per minute.

However, Chemical Banking negotiated a discount rate of 77 cents per minute during peak hours for one of its major locations in London. By comparison, prices for calls between New York and London on the public switched network during peak hours are $1.51 for the first minute and 99 cents for each additional minute.

Chemical Banking also negotiated rates to other international locations, including $1 per minute for calls to several Caribbean and South American locations.

Chemical Banking negotiated three volume discount plans — one for domestic switched service, one for domestic private-line service and one for international calls.

During any month in which domestic switched service charges exceed $30,000, Chemical Banking qualifies for a discount. An 8% discount applies to charges between $30,000 and $50,000; a 10% discount applies to charges between $50,000 and $250,000; and a 12% discount for charges over $250,000.

For domestic data lines, if Chemical Banking commits to spending $100,000 per month on 9.6K, 56K or 1.5M bit/sec data lines, it will get a 25% discount off the charges for adding or deleting private lines. The charges for adding or dropping T-1 lines without the discount are $1,710 plus $9 per mile for an interoffice circuit of 100 miles or less, and $1,900 plus $7.10 per mile for interoffice circuits greater than 100 miles.

Chemical Banking also negotiated a volume discount plan for international calls when charges exceed $10,000 or more. The company gets a 5% discount for charges between $10,000 and $100,000; a 7.5% discount for charges between $100,000 and $200,000; and a 10% discount for charges over $200,000.

Andersen Consulting tests international ISDN link

By Bob Brown
Senior Editor

CHICAGO — Andersen Consulting last week began evaluating use of ISDN here and in Japan for the end links of an international switched 56K bit/sec connection used to support videoconferencing and transmission of Group IV facsimiles.

The monthlong test, one of the first to examine international Integrated Services Digital Network services, will link Andersen Consulting's headquarters here with its Tokyo office.

The management services company hopes to determine the savings potential of ISDN.

In the U.S., Illinois Bell Telephone Co. is providing Ameritech ISDN Centrex service for local access to an AT&T Switched Digital International 56K bit/sec circuit to Japan.

Kokusai Denshin Denwa, Ltd. is supplying the long-distance service via its International ISDN Service on the Japanese end, and Nippon Telephone and Telegraph, Ltd. is handling the local ISDN circuit into Tokyo.

Andersen Consulting, a subsidiary of Arthur Andersen & Co., already was an Illinois Bell ISDN Basic Rate Interface service customer.

"It's not 64K bit/sec clear-channel end-to-end, but it's 56K bit/sec and that [has] the same functionality," an Illinois Bell spokesman said. "In the not-too-distant future when the local network and the AT&T networks have their [Signaling System 7] connectivity in place, these same facilities will be migrated to a pure ISDN arrangement."

The international ISDN link will enable Andersen Consulting to support low-volume traffic

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Corrections: The story "New IBM software lets users blend asynch ASCII traffic with SDLC" (*NW,* Nov. 13) incorrectly reported that a new IBM software product, Programmable Network Access Version 1.0, "enables users to integrate asynchronous ASCII traffic into asynchronous Systems Network Architecture backbone nets." The product enables users to integrate asynchronous ASCII traffic into synchronous SNA backbone nets.

In the story "Vendors wage PC bus war on LAN superserver front," (*NW,* Nov. 20), Jeff Hudson, vice-president of sales for NetFrame Systems, Inc., was incorrectly quoted as saying that NetFrame's mean time between failures will be "lower" than similar products. Hudson actually said "longer."

VSATs help automakers face future

By Paul Desmond
Senior Writer

Automakers in the U.S. are turning to VSAT networks in an effort to arm dealers with information they'll need to fight the service wars of the 1990s.

Service, which is becoming more important in many industries, is expected to emerge as a major selling tool in the auto industry as carmakers find it increasingly difficult to differentiate their products.

For most manufacturers, that means redesigning the networks they use to support dealers to accommodate new applications such as on-line vehicle diagnostics and broadcast video, which is used to distribute industry news, training courses and sales tips.

"There will be one distinguishing factor between manufacturers and that's customer satisfaction," said Rich Sittel, advanced communications manager for Toyota Motors Sales USA, Inc. "You must be able to provide the dealerships with access to customer information that they haven't had before on a national basis."

The network technology that is enabling automakers to meet the new demands is very small aperture terminal satellite networks. The auto industry already comprises the largest installed base of VSAT users, and in 1989, it is expected to account for over half of all VSAT purchases.

Chrysler Corp., Ford Motor Co., General Motors Corp., Nissan Motor Corp. and Toyota have installed VSAT nets. Although GM currently uses VSATs only for broadcast video and Ford only uses them to support internal locations, as opposed to independent dealers, spokesmen for both companies said they are studying the possibility of using VSATs to support data links to dealers. Others, including Volkswagen of America, Inc., are actively pursuing plans to install VSAT nets.

VSATs are attractive because they are more cost-effective and easier to engineer than terrestrial leased-line networks, and they can support broadcast video — an application that's garnering universal interest among automakers and one that would be cost-prohibitive to support via terrestrial lines.

GM began installing its VSAT net, which now supports over 2,100 dealers, in July 1988 to support video applications, said a spokesman from Electronic Data Systems Corp., which runs the net for parent company GM. GM uses the net to send dealers its own industry news program and GM-specific programming, ranging from technical training to selling techniques.

GM's video net is similar to Westcott Communications, Inc.'s Automotive Satellite Television Network (ASTN), which offers generic auto industry programming to thousands of dealers nationwide, sometimes via automaker's private VSAT nets.

Chrysler dealers, for example, use their VSATs to receive ASTN programming and to support data links to Chrysler's mainframe in Highland Park, Mich., said Paul Noble, Pentastar Satellite Communications Network project manager for the automaker. Chrysler's VSAT net now supports over 2,200 sites, most of which are dealers, and will eventually reach 6,000 dealers in the U.S. and Canada, he said.

Diagnosis via satellite

The dedicated hub network has enabled Chrysler dealers to reap the benefits of applications that would have been too expensive, if not impossible, to provide over land lines, he said.

"All of the applications are aimed at making our dealers competitive throughout the 1990s," Noble said. "Diagnosing vehicles over the satellite network is a good example."

Cars today are outfitted with up to 20 microprocessors that monitor such things as engine performance, suspension and electrical components.

> The auto industry already comprises the largest installed base of VSAT users.
>
> ▲▲▲

Computers in Chrysler service bays can extract data from those devices and send it via VSAT to the Highland Park mainframe. Mainframe applications then diagnose the problem, recommend repair procedures and supply mechanics with the latest information needed for the job.

Luxury VSAT net

Toyota is another manufacturer that is sold on the virtues of VSATs. To date, it has installed 100 VSATs to support 39 internal locations and 61 dealers of its Lexus luxury car line. Toyota plans to grow its network to 1,100 Toyota sites, but it is initially focusing on Lexus dealers to support applications tailored to owners of luxury cars, Sittel said.

Lexus dealers will be outfitted with IBM Application System/400 minicomputers that will store maintenance data about customers' cars. That data will be fed periodically to a corporate mainframe that all dealers can access. Customers can then go to

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EDI study: No payoff for novice users; pioneers reap big savings

By Paul Desmond
Senior Writer

WASHINGTON, D.C. — While most companies are still testing the EDI waters, advanced electronic data interchange users are enjoying a generous payback from the technology, according to a nationwide survey to be released here next week.

More than 65% of the 613 companies that responded to the survey said they had EDI links to less than 10 trading partners, and only 10% said their EDI networks extended to 50 or more trading partners.

Nearly half of those surveyed said EDI was costing them money. The sponsors of the study said it is likely many of those users aren't correctly measuring the benefits of EDI or haven't generated enough EDI traffic to reach a break-even point.

But a smaller group of more advanced EDI users, representing only 16% of respondents, reported savings totaling eight times what the larger group spent on EDI.

The survey, titled "EDI in North America: Status of Usage and Technology," is the result of a yearlong effort by the Transportation Data Coordinating Committee: Electronic Data Interchange Association (TDCC: EDIA) in Alexandria, Va., and Gartner Group, Inc. of Stamford, Conn. The survey will be released at the TDCC: EDIA's 21st National EDI Systems Conference & Exhibit here next week.

More than 10,000 questionnaires were distributed, both at last year's National EDI Conference and in subsequent mailings, said Bob Watkins, director of program development for the EDIA. Additionally, "EDI experts" — mostly EDI pioneers involved in large-scale EDI implementations and standards efforts — were interviewed via telephone.

Victor Wheatman, Gartner Group's program director for interenterprise systems, explained why some users haven't realized paybacks from EDI.

"The companies that are reporting [EDI] as a net cost aren't evaluating what their dollar benefits are," Wheatman said. "Maybe they're relatively new in their EDI implementations, so they haven't yet reached the break-even point."

Watkins said EDI efforts at some firms may be stalled because users find it difficult to predict how EDI will benefit them.

To help them out, the EDIA at next week's conference will unveil a personal computer-based program designed to enable users to create simulation models and analyze EDI benefits, he said.

The survey shows that users are planning to expand their EDI efforts. Of the respondents, 10% said they have EDI links to 50 or more trading partners. Another 33% said they will establish links with 50 or more partners within two years. And while 15% of respondents said they have no EDI trading partners today, only 1% expect that to be the case in two years.

Emerging personal computer-based software packages that support EDI will play a key role in that growth, Watkins said. Up to now, large companies with mainframe-based EDI implementations have accounted for the lion's share of EDI users, he said.

"But the growth for EDI is with the small company and that means in a PC environment," Watkins said. A session at next week's conference will be devoted to the personal computer's role in EDI.

Asked why they implemented EDI, nearly half of the companies said they did so to gain a competitive edge and about one-third did so because of coercion from trading partners (see graphic, page 1).

But the sources interviewed said coercion actually plays a larger role. "The experts indicated overwhelmingly that the primary reason companies get involved in EDI is due to formal or informal coercion by trading partners [usually customers]," the study said.

The experts said users may not want to admit they were coerced or may not even realize it has occurred. In any case, "it is clear the coercion factor continues to play a role in getting companies involved in EDI," the study concluded.

The experts said executive commitment was the single most important factor in the success of an EDI project. Other survey respondents rated five factors as above average in importance for a successful EDI implementation. They are: pilot tests, vendor evaluations, working with current EDI users and trade associations, gaining executive commitment and working with business unit managers to determine their requirements.

More than 60% of the respondents said either their chief executive officer or chairman of the board was aware of and committed to EDI.

See the FAXNeT Form on Page #41

Andersen tests int'l ISDN link

continued from page 4

sites that could not afford more costly point-to-point private-line service.

According to Cory Van Wolvelaere, a partner with the telecommunications division of Andersen Consulting, the ISDN services will be used to supplement the company's global private telecommunications network, dubbed AANet.

Supporting Group IV fax with the ISDN service promises clearer transmissions, store-and-forward services and reductions in courier charges, Van Wolvelaere said. ISDN is expected to reduce monthly fax costs between Chicago and Tokyo from $328 to $150, he said.

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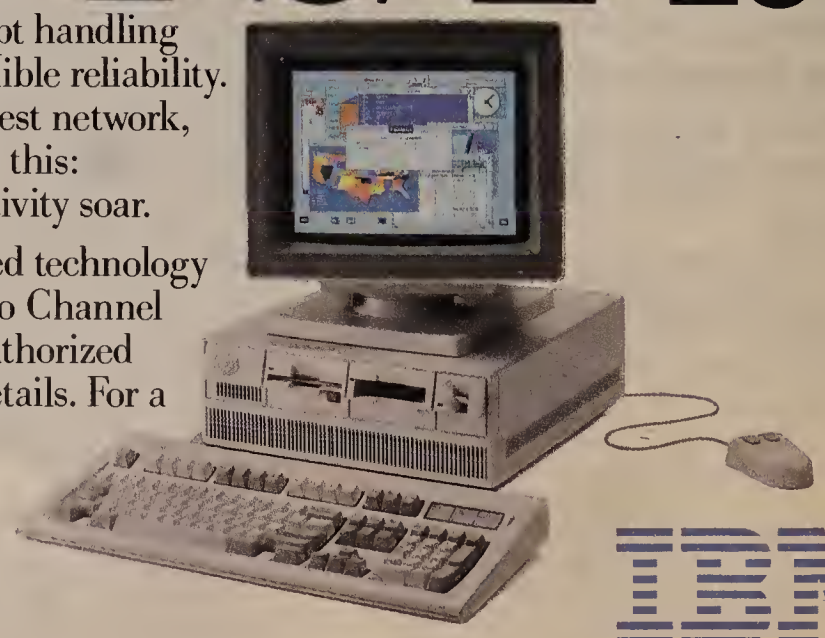

IBM

INDUSTRY UPDATE

VENDOR STRATEGIES, MARKET TRENDS AND FINANCIALS

Worth Noting

Pacific Bell and US Sprint Communications Co. recently agreed to develop and market complementary 800 services to simplify the ordering, billing and maintenance of 800 services in California. The offerings, which will be supported by an 800 data base being developed by Pacific Bell, are subject to approval by the California Public Utility Commission.

People & Positions

The board of directors for **M/A-COM, Inc.,** a Burlington, Mass.-based maker of microwave transmission equipment, last week elected **Thomas Vanderslice** chairman and chief executive officer.

Vanderslice resigned in May from his position as chairman and chief executive officer of Apollo Computer, Inc. amidst Hewlett-Packard Co.'s acquisition of the Chelmsford, Mass., workstation maker.

In his new position, he will be charged with trying to turn around the company's recent deteriorating financial performance.

M/A-COM reported a loss of $7.5 million for the fourth quarter, ended Sept. 30, compared to earnings of $4.7 million the year before.

Vanderslice replaces **Thomas Burke,** who died in a car accident in September.

Howard Charney, vice-president and general manager of **3Com Corp.**'s Central Manufacturing Division, will step down to become a consultant for the local-area network vendor, effective Dec. 15.

A 10-year 3Com veteran, Charney served as the company's general counsel and first

(continued on page 50)

Users eager for competition in local switched services

Many welcome MFS attempt to open local loop.

By Bob Brown
Senior Editor

Following Metropolitan Fiber Systems, Inc.'s (MFS) recent FCC filing to end the RBHCs' virtual stranglehold over local switched services, users last week said they would be willing to experiment with alternative services.

Having already taken advantage of the benefits derived from competition in the private-line services sector, many users said they would like to see greater competition for switched services in the local loop.

"We'd like to see the local market opened up as much as the long-distance market," said Ken Starkey, associate director of communications for the brokerage firm of Bear Stearns & Co., Inc. in New York.

However, some users said that should MFS prove successful in its effort to open the local loop, it would have to enter as a low-cost provider to win business.

Users said the alternate network advantage that MFS boasts in the private network market would be negated in the switched market since the carrier has proposed collocating its network gear at the existing local telephone company central office.

MFS, which is based in Oakbrook Terrace, Ill., filed two legal petitions with the Federal Communications Commission in November calling for an end to the regional Bell holding companies' hold on the local loop ("MFS contests telcos' lock on local loop," *NW,* Nov. 20). MFS argued that competition in the local market for switched services will benefit users by driving down prices, spurring the development of new services and increasing the availability of alternate routing.

For MFS, entry into the local switched access market would enable it to compete with the RBHCs for some $20.6 billion in annual access fees charged to long-haul carriers. Teleport Communications Group, a New York-based alternate access carrier, is also attempting to get into the switched access market.

Preliminary findings from recent research on the bypass market conducted by The Yankee Group, a Boston-based market research firm, showed that users are interested in using alternative switched services, said Mark Lowenstein, a telecommunications analyst at the company.

Most users contacted by *Network World* agreed.

"We welcome competition in

(continued on page 11)

INDUSTRY BRIEFS

Sun Microsystems, Inc. last week announced that **Andersen Consulting** has agreed to remarket the Mountain View, Calif.-based workstation maker's entire line of computers and software for commercial systems integration projects.

The companies estimated that the agreement will produce at least $10 million in sales of Sun equipment in the first year.

A newly formed unit within Andersen Consulting called the New Age Systems Group will handle commercial systems integration projects built around Sun workstations. The group was set up in response to strong customer demand for Unix-based workstations in distributed computing networks.

Sun and Andersen Consulting already have several joint commercial projects under way, including development of software for imaging and document management, distributed data bases, computer integrated manufacturing and artificial intelligence.

Andersen Consulting is a subsidiary of Arthur Andersen & Co. in Chicago.

Codex Corp. in Canton, Mass., last week announced it has been selected by the U.S. Defense Communications Agency for a five-year, $51 million data communications equipment contract.

The Defense Communications Agency's contract decision had temporarily been halted by appeals filed by AT&T Paradyne and Racal-Milgo, according to a Codex spokesman.

Codex will provide modems, network management systems and related professional services for government agencies supported by the Defense Communications Agency's Defense Commercial Communications Office in all 50 states.

Distributed data bases on the rise

Market for data base systems in the financial, banking and insurance industries.

		Systems installed	Revenue (in millions of dollars)
Client/server systems	1993	63,000	$875
	1988	8,450	$140
True distributed data base systems	1993	1,600	$350
	1988	25	$10

GRAPHIC BY SUSAN J. CHAMPENY — SOURCE: BUSINESS RESEARCH GROUP, NEWTON, MASS.

Equipment vendors miffed by Tariff 12

Independent equipment manufacturers say AT&T net deals are squeezing them out of the market.

By Gail Runnoe
Washington Correspondent

WASHINGTON, D.C. — Although a select group of Tariff 12 customers have successfully negotiated large network discounts, these deals may eventually come back to haunt the vast majority of users by thinning the ranks of competitive offerings and raising prices.

A group of independent equipment manufacturers and systems integrators claim they are being virtually shut out of the marketplace by AT&T's new barrage of integrated voice/data network deals.

These vendors say Tariff 12 is hurting their business and will ultimately affect consumers by driving competition out of the marketplace. During the last two years, AT&T has put together 23 deals using Tariff 12, each of which locked up multimillion-dollar customers for several years.

Shooting in the dark

Although Federal Communications Commission rules mandate that AT&T must allow customers to purchase AT&T services in bulk and resell them, equipment vendors claim they are shooting in the dark when it comes to purchasing services offered under Tariff 12.

"Typically, when we configure a network for a customer, we'll choose the particular kinds of communications facilities from any number of vendors that we think will work cost-effectively for the customer, and we add equipment to that," said Robert Stearns, vice-president of corporate marketing at Codex Corp., a Canton, Mass., supplier of multiplexers and other network equipment.

"We can't do that with Tariff 12. We have no idea what Tariff 12 is; nobody does," he said.

Codex's contention is that Tariff 12 is not a tariff as defined by the Communications Act of 1934. The company claims that the Tariff 12 deals fail to specify all of the terms and conditions, including any equipment that will be needed by the user.

"A tariff is supposed to be an algorithm, a matrix or a standard explanation of something any customer could buy if they wanted," Stearns said. "The way Tariff 12s are configured is between AT&T and the customer, and the

> "We have no idea what Tariff 12 is; nobody does," Codex's Stearn said.
>
> ▲▲▲

customer is not permitted to share that information with anybody.

"As a result, it's very difficult for anybody who isn't a participant to compete with it. We just think that's unfair," he said.

A market divided

Herbert Marks, Washington, D.C. counsel for the Independent Data Communications Manufacturers Association (IDCMA), which represents Codex, Racal-Milgo, General DataComm Industries, Inc. and Universal Data Systems, Inc., said, "Our grounds evolve essentially from the fact that [in its Tariff 12 filings, AT&T] has not published a generally available tariff that is comprehensible."

The IDCMA is hoping the U.S. Court of Appeals will hear an earlier request to overturn an FCC

(continued on page 11)

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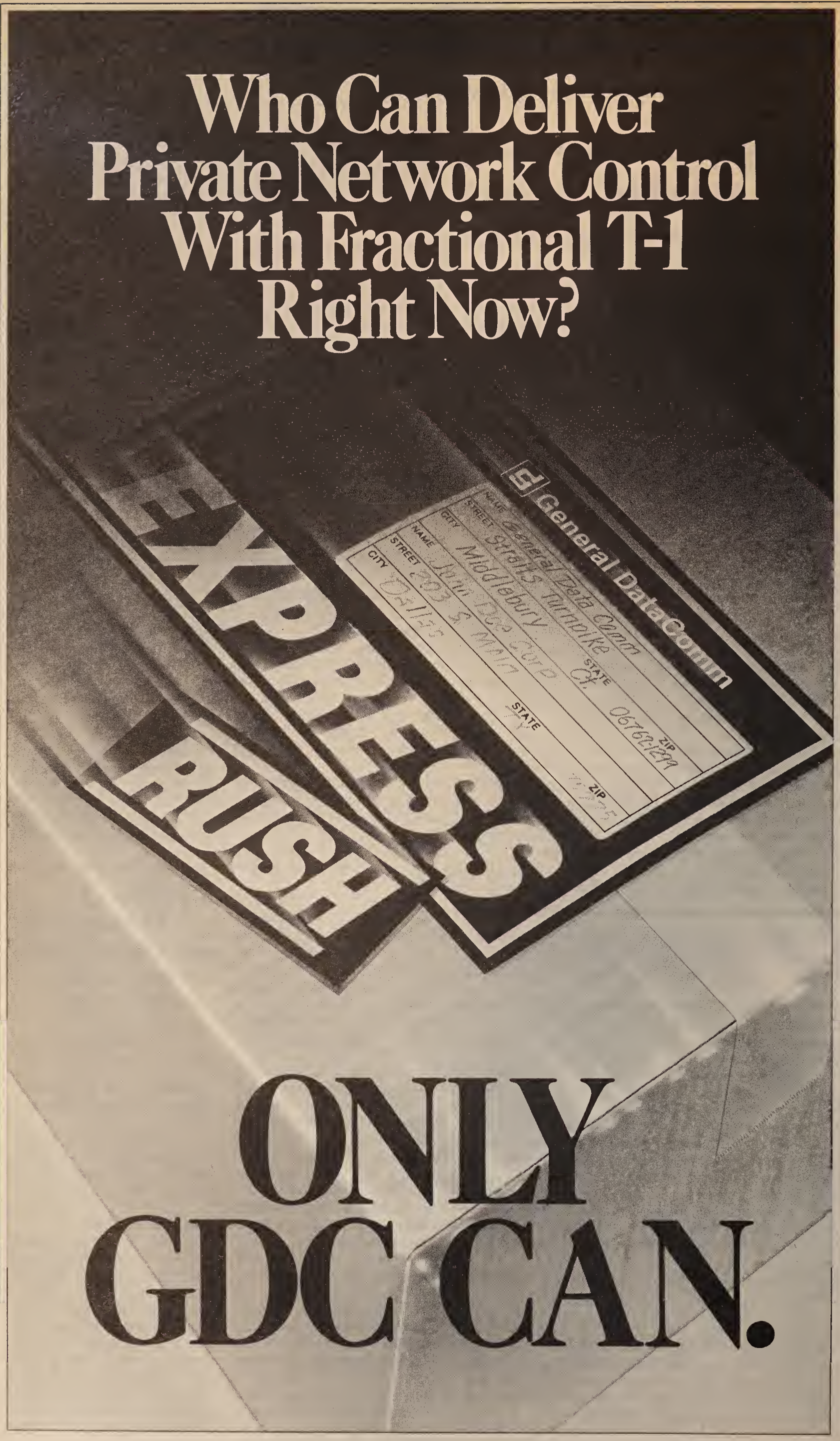

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See the FAXNeT Form on Page #41

General DataComm

Equipment vendors miffed by Tariff 12

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decision that affirmed AT&T's right to offer custom network deals under Tariff 12.

Misleading strategy?

Equipment vendors also allege that AT&T is misleading Tariff 12 customers into thinking that discounted transmission rates are tied to their use of AT&T equipment.

Since such bundling of equipment and services is clearly illegal, and although AT&T refutes any charges of doing so, vendors such as Codex want AT&T to make users explicitly aware of this separation by including this information in marketing literature.

Because users are afraid of doing anything to jeopardize their huge discounts, they take the AT&T deal as presented and never question the choice of network equipment, Stearns said.

However, a spokeswoman for AT&T said, "We do not think our marketing is misleading. AT&T is required to keep communications and equipment separate, and we do so. We operate in accordance with the rules."

As far as the claims that Tariff 12 is not a real tariff, she said, "Our competitors have tried to discredit the tariff and challenge our use of it, but the FCC has upheld it. We stand by the FCC decision."

The IDCMA's Marks estimates it will take about a year for the IDCMA to resolve its Tariff 12 complaint in court.

According to Raymond Kudish, director of legislative and regulatory affairs for Racal-Milgo, AT&T will likely file one Tariff 12 deal a week during that time frame. "If this continues," he said, "you will see independent companies suffer some major losses in their business."

Codex's Stearns said Tariff 12 has been hurting his company, and he added that customers are also being hurt by Tariff 12.

"Ultimately, the customer is not getting the number of choices that serve him best," he said. "Once [AT&T] achieves larger market share, you can expect prices will go up."

Buyers have smarts

Peter Bernstein, senior analyst at Probe Research, Inc. in Cedar Knolls, N.J., said users are not being hurt or hoodwinked by Tariff 12.

"These are very sophisticated procurements," he said. "I would think the end user would be smart enough to understand [his options]."

Bernstein said that while he understands the competitive concerns surrounding Tariff 12, "as long as the FCC chooses to allow AT&T the flexibility [of offering Tariff 12 packages], the competition will have to come up with some teaming arrangements to fill in product gaps."

Equipment vendors should develop closer relationships with the carriers in order to compete better in the market, he said.

"If someone is offering a more sophisticated mousetrap, competitors will have to get their offerings up to specs," he said. "To me, that's the nature of competition."

Users eager for competition

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the local market, even if we decide not to use the new services," said Sandra Bloomfield, assistant vice-president in telecommunications at The Delaware Group, a mutual funds firm in Philadelphia.

"With something like 50% of network costs coming from the local loop, I'd expect to see the BOCs react by cutting prices and providing better service," said Bloomfield, whose company is an MFS customer.

The Delaware Group probably would try alternate switched services for backing up critical lines, Bloomfield said. But the mutual funds company is not likely to split its local switched traffic between two carriers, as it does for some T-1 services, for fear of losing volume discounts, she added.

Bloomfield said it would be important for the alternate carriers to develop advanced services, such as Integrated Services Digital Network offerings, to compete effectively with the RBHCs.

Another likely customer of alternate switched access services is Maryland Casualty Co. in Baltimore. The insurance company uses MFS to bypass Chesapeake & Potomac Telephone Co. of Maryland for almost all of its local telephone services with the exception of local switched services, said Chuck Ferraro, the insurance company's second vice-president of telecommunication services. MFS features strong customer service, a reliable network and alternate routing, he said.

But for MFS to persuade Maryland Casualty to switch to a future local switched offering, the carrier "would have to show us some functionality and price advantages," Ferraro said.

MFS would have to compete more on price in the switched services market than it does in the private-line market because it would use existing facilities rather than an alternative network, users said. Users have turned to MFS and its counterparts in the past for alternate routes to interexchange carriers or between company sites to provide a backup link in case of a local loop crash. But the switched services suggested by MFS would share the local phone company net and be prone to the same outages.

"The reason we use Teleport Communications is because they have a very robust and entirely separate network from the local exchange carrier," said Frederick Matteson, vice-president and director of communications services for Nomura Computer Systems America, Inc. in New York. "I can't see the real business benefit that alternate switched services would bring me."

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If these discounts sound like good reasons to look into AT&T digital services, here's yet another reason to act quickly. *Through December 18, AT&T will waive all nonrecurring charges, even on office multiplexing, when you purchase T1.5 or T45 with an interoffice channel circuit.**

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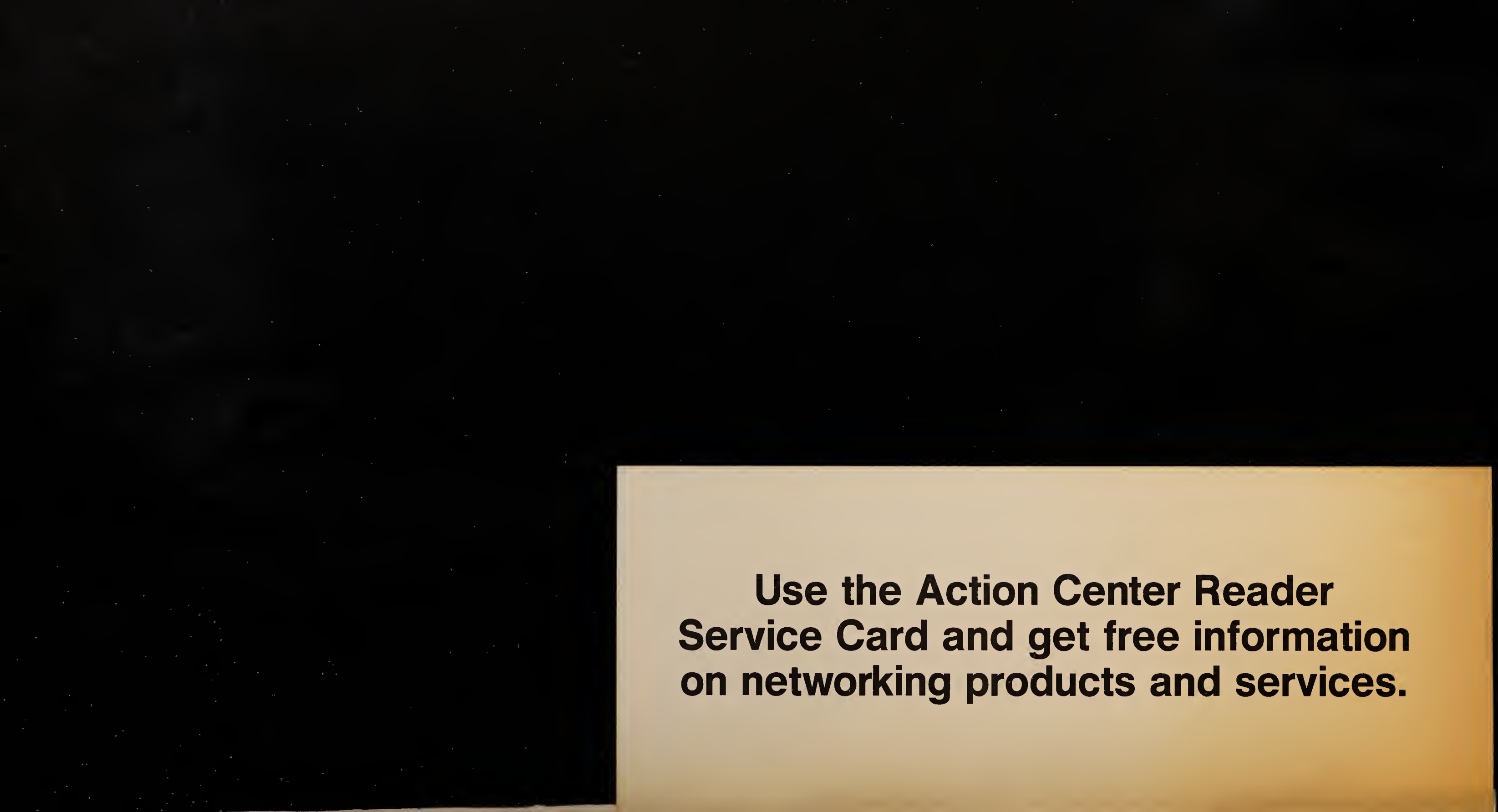
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Worth Noting

AT&T provided ship-to-shore calling services for the White House staff at last weekend's shipboard meeting between President Bush and Soviet President Mikhail Gorbachev in the Mediterranean Sea by running an undersea cable to the ship from Malta. Calls were routed via satellite to Washington, D.C.

Carrier Watch

AT&T recently introduced WATS-One Line Access, a service option that will enable customers to use existing interstate WATS lines for intrastate and international calls.

AT&T WATS customers today use different access lines for each type of service and, by its own admission, AT&T is the last of the top three carriers to offer the ability to use one access line for all types of calls.

WATS-One Line Access will save users money by letting them consolidate traffic on fewer lines, simplify line engineering and free up PBX ports, the carrier said.

In its filing with the Federal Communications Commission, AT&T said that cementing the billing and provisioning arrangements with local carriers would limit initial service availability to the states of Texas and Pennsylvania. The service is scheduled to be cut over Jan. 1 in those states, and AT&T plans to offer it in more states by the end of 1990.

AT&T will charge a $266.50 onetime connection charge per access line, monthly charges of $36.70 per line and $12 per service group. The service also carries a monthly usage charge.

To promote WATS-One Line Access, the carrier will waive connection charges for lines installed within 90 days of the date the option becomes available in each state.

Users rate the PBX vendors

	1st	2nd	3rd	4th	5th	6th
Ease of installation	Siemens Information Systems, Inc. 4.000	NEC America, Inc. 3.950	Mitel Corp. 3.833	Northern Telecom, Inc. 3.725	IBM/Rolm 3.613	AT&T 3.512
Ease in making moves, adds and changes	Mitel 4.077	NEC 4.000	Siemens 4.000	Northern Tel 3.736	Rolm 3.732	AT&T 3.409
Ease of expansion	Northern Tel 3.944	NEC 3.864	Siemens 3.727	Mitel 3.692	AT&T 3.609	Rolm 3.378
User features	Mitel 4.231	Siemens 4.091	Rolm 4.094	Northern Tel 3.875	NEC 3.773	AT&T 3.379
Maintenance	Mitel 4.000	NEC 3.952	Northern Tel 3.861	AT&T 3.795	Siemens 3.727	Rolm 3.475
Overall performance	Northern Tel 4.097	Siemens 4.091	Mitel 4.000	NEC 4.000	Rolm 3.890	AT&T 3.830
Reliability	Northern Tel 4.181	NEC 4.143	AT&T 4.103	Rolm 3.988	Mitel 3.923	Siemens 3.909
Repairability	Northern Tel 4.169	AT&T 3.966	Mitel 3.846	Siemens 3.818	NEC 3.810	Rolm 3.778
Remote diagnostics	Siemens 4.000	Northern Tel 3.803	Rolm 3.728	Mitel 3.727	AT&T 3.565	NEC 3.095
Software support	Northern Tel 3.472	AT&T 3.329	Mitel 3.250	Rolm 3.122	Siemens 3.091	NEC 3.048
System features	Rolm 3.902	Mitel 3.846	Northern Tel 3.761	Siemens 3.727	NEC 3.500	AT&T 3.471
Technology	Northern Tel 3.875	Mitel 3.769	Siemens 3.727	Rolm 3.667	AT&T 3.471	NEC 3.273

Ratings are on a scale of 0 to 5, where 0 is poor and 5 is excellent. Figures are based on a survey of approximately 500 midsize and large PBX users conducted earlier this year.

GRAPHIC BY SUSAN J. CHAMPENY SOURCE: TFS, INC., WESTFORD, MASS.

MCI adds 3-year contract option, discounts to Vnet

Carrier hopes to attract new and former users.

By Bob Wallace
Senior Editor

WASHINGTON, D.C. — MCI Communications Corp. recently added a three-year contract option and high-end volume discounts to its Vnet virtual network service in an effort to make the service more attractive to large users.

The carrier hopes to use these tools, along with its virtual network management systems and low pricing, to attract new customers and win back users from rivals AT&T and US Sprint Communications Co., according to industry analysts.

Before the changes, which took effect Dec. 1, MCI offered only one- and two-year Vnet contracts; it also set a 21.5% maximum discount for users spending more than $250,000 a month on Vnet.

Under the new volume discount plan, known as Option 4, Vnet is billed based on 18 usage levels. The top level, for users with more than 4.25 million minutes of Vnet traffic a year — roughly equivalent to $6 million worth of traffic — offers a maximum discount of up to 31.4%.

In addition to volume discounts, MCI started waiving onetime installation fees and monthly charges for its Customer Information Manager and Network Information Management System virtual network management systems last week as part of a promotion that will run until March 31. MCI will charge the normal monthly fee for the offerings when the promotion expires.

Customer Information Manager allows users to create, view and revise customer-specific data from an on-site terminal. Customers can use the option to change dialing plans, direct the path of calls using a special overflow feature, and activate and deactivate authorization codes.

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MCI's Vnet Option 4 discount plan

Monthly minutes (in thousands)	Discount
0 to 49	0.0%
50 to 74	3.0%
75 to 99	4.5%
100 to 149	8.5%
150 to 199	13.0%
200 to 249	17.0%
250 to 374	19.0%
375 to 499	23.2%
500 to 749	24.2%
750 to 999	24.8%
1,000 to 1,249	27.8%
1,250 to 1,499	28.0%
1,500 to 1,749	28.4%
1,750 to 1,999	28.8%
2,000 to 2,249	29.0%
2,250 to 3,249	29.4%
3,250 to 4,249	30.4%
More than 4,250	31.4%

SOURCE: MCI COMMUNICATIONS CORP., WASHINGTON, D.C.
GRAPHIC BY SUSAN J. CHAMPENY

Bank hopes to gain edge using ISDN ANI

Maryland Bank exploring how automatic number identification can improve customer service.

By Bob Wallace
Senior Editor

WILMINGTON, Del. — Maryland Bank, N.A., an early ISDN Primary Rate Interface user, is hoping to gain a competitive edge over rival banks by using the service's automatic number identification (ANI) feature to improve customer service.

The bank, which cut over ISDN in August, is using the service to link an AT&T System 85 at its headquarters here to a Primary Rate Interface-equipped AT&T 4ESS digital central office switch in Philadelphia.

"We didn't go after ISDN for cost benefits," said Roger Grossklaus, vice-president and general manager of network management for Maryland Bank. "Our goal was to use it to provide more immediate and complete service to our customers. We can use ANI to better manage our customer relationships."

The System 85, configured to serve as an automatic call distributor, will help the bank's 400 customer service representatives field approximately five million calls per year.

The switch is linked to a Unix-based AT&T 3B2 minicomputer that supports an Informix Software, Inc. relational data base. The processor serves as an intermediary between the private branch exchange and the IBM Systems Network Architecture host that supports the agents' terminals.

Maryland Bank uses ANI — which delivers the telephone number of the caller — to handle customer credit card orders and billing inquiries. When customers call the bank's toll-free number, the number of the calling party and an agent identification number are passed to the adjunct processor. That processor attempts to match the ANI information with customer telephone numbers in the relational data base.

If a match is found, the processor passes the account number of the customer file to the IBM mainframe.

"The first thing you have to have is accurate relational information," Grossklaus said. "If we can't relate a telephone number to an account number, there's no way we can use [ANI] as a call-processing tool."

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WASHINGTON UPDATE

BY ANITA TAFF

AT&T proposes promotion for SDN customers. AT&T has asked the Federal Communications Commission for permission to offer new Software-Defined Network (SDN) customers a special promotion, which counters promotional efforts from competing carriers. In a recent filing, AT&T said that beginning Jan. 5, it wants to offer a credit of $150 for the first three months of service for every customer location converted to SDN, a virtual network service. The amount of credits per customer cannot exceed $30,000.

To qualify for the credits, customers must have a pending order for SDN placed after Nov. 21 or order the service by Feb. 5 and request installation by May 5. Customers must also show that prior to Nov. 21, they received a proposal from another interexchange carrier offering credits to new customers of SDN-equivalent services.

AT&T claims that at least one rival, US Sprint Communications Co., begins charging customers of its other services lower Virtual Private Network (VPN) rates when orders are placed.

Because there may be a delay of several weeks between the time the order is placed and when the installation is completed, customers may pay significantly less for existing services.

As proof that US Sprint is making such deals, AT&T submitted a copy of a letter from Gary Graham, a branch manager for US Sprint, outlining a deal for a customer whose name had been deleted. US Sprint said it would begin charging the customer VPN/WATS rates as soon as it received the user's letter of intent to purchase the new service.

Liberty Mutual's adoption of SDN to slash costs

By Bob Brown
Senior Editor

BOSTON — Liberty Mutual Insurance Co. recently installed an AT&T Software-Defined Network (SDN) that will enable the insurer to serve customers better and reduce communications costs by more than $2 million a year.

The 160-node nationwide SDN, provided under a three-year contract, replaces multiple existing AT&T long-distance services and provides a uniform seven-digit dialing plan.

Although Liberty Mutual network executives were enthusiastic about the virtual network service, the project would have had to wait until next year if not for a special AT&T promotional tariff under which the carrier waived installation fees, according to Dick Sheplar, Liberty Mutual's SDN network project manager.

"That deal saved us $700,000 in up-front costs," he said. "Plus, we're getting savings from using the network now instead of down the road."

Liberty Mutual expects SDN to save it at least $2 million a year compared to what it was paying for other AT&T services, including Megacom, Sheplar said. The per-minute cost for long-distance calls will drop from about 23.5 cents to 16.5 cents, he said.

According to Sheplar, the network is among the largest SDN nets supported entirely by AT&T private branch exchanges. Liberty Mutual has more than 160 System 75 PBXs in its network and another eight System 85 switches. The company plans to upgrade some of its System 85 PBXs to Definity switches next year.

Among the most noticeable benefits expected from the revamped network is a reduction in the number of calls to Liberty Mutual's switchboards, Sheplar said. "By enabling employees to call each other directly on-net, our switchboard operators can do an even better job of handling customer calls," he said.

Liberty Mutual has been using the SDN mostly for voice, but it is beginning to use it to support facsimile traffic as well, according to Sheplar.

"We consider facsimile to be a voice-related service, though some people insist it is a data service," he said. The company expects to save $50,000 a year by sending fax traffic over SDN.

The network may also eventually be used to support dial-up data links to back up other data communications services, Sheplar said. Currently, the data and voice nets at Liberty Mutual are separate.

Liberty Mutual plans to use SDN's Expanded Service Management System to manage the net from an AT&T PC 63867 computer at its headquarters here.

The company looked at other carriers before deciding to stay with AT&T, "but we could not be sure of either the quality or the prevailing price structure of the other services," Sheplar said. "Also, we had a long-standing relationship with AT&T for service and equipment."

Sheplar said he was skeptical about whether AT&T could produce the savings it had estimated in a network study it conducted for the company, but pilot tests earlier in the year showed that AT&T's projections were on the money.

MCI adds option, discounts to Vnet

continued from page 13

Through the Customer Information Manager terminal, Network Information Management System provides on-line access to data regarding Vnet traffic. It also offers near real-time operational and performance information.

"MCI is making these moves to position Vnet as a virtual network service for very high-end users," according to Daniel Briere, president of TeleChoice, Inc., a Manchester, Conn.-based consultancy. "They're going after AT&T [Software-Defined Network] customers and using features, network management and volume discounts as differentiators."

Option 4 customers who discontinue service during the first three years of selecting the option will be assessed a $5,000 termination charge plus a charge equal to 7% of the total undiscounted usage from the date of cutover to the time the last site is removed from the Vnet.

Bank hopes to gain edge using ISDN ANI

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When a match is made, the 3B arranges to have a list of the caller's past dealings with the bank passed to the agent's terminal at the same time that the call is delivered, according to Grossklaus.

After speaking with the caller, the agent can request transaction-specific information from the host. If the agent takes action on the account, the new information is passed to the host, he said.

"Before ANI, calls came in and were routed blindly to agents, who had to ask callers their account number," Grossklaus said. "The agent keyed in the number, received the customer file and *then* began talking intelligently to the customer."

Like other firms, Maryland Bank is also using ANI to streamline its bill collection operations by locating hard-to-track debtors. The bank wants to use ANI to capture the telephone numbers of debtors who call to vent their anger about such actions as having their account transferred to a collection agency ("Agency counting on PRI to locate debtors," *NW,* Oct. 16).

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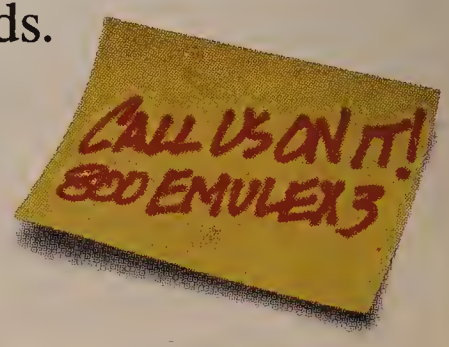

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See the FAXNeT Form on Page #41

DATA COMMUNICATIONS

PRODUCTS, SERVICES, ARCHITECTURES, STANDARDS AND NETWORK MANAGEMENT

Worth Noting

While most minicomputer makers are struggling through lean times, the demand for IBM's Application System/400 remains steady, according to a recent study by International Data Corp. of Framingham, Mass. For every AS/400 sold in 1988, 2.3 will be sold in 1989, the study said.

Data Packets

Covia last week announced it will replace its current network of Amdahl Corp. T-1 multiplexers with StrataCom, Inc. Integrated Packet Exchange (IPX) fast-packet T-1 multiplexers.

Covia, a partnership owned by airlines including United Air Lines, Inc., USAir and British Airways, will install about 35 of the multiplexers to upgrade its Apollo computer reservation network. Apollo supports more than 10,000 locations worldwide and offers information on 700 airlines, 32 car rental companies and 19,000 hotels.

StrataCom's multiplexers switch both voice and data in packet format and do not require customers to dedicate DS0 channels to voice or data, a feature Covia expects will help it save money by making more efficient use of bandwidth, according to Thomas Holloran, Covia's manager of tactical planning. In addition, StrataCom can suppress repetitive patterns in a digital voice or data stream to trim required transmission bandwidth by 25% to 60%, Holloran said.

The IPXs also offer more advanced net management features than the Amdahl equipment, such as the ability to dynamically route around failed nodes and to run unmanned at remote sites.

Covia expects the fast-packet technology will help position the company to han-

(continued on page 20)

User opts for distributed net-over-mainframe setup

Cutover dumps leased lines for dial-up service.

By Paul Desmond
Senior Writer

STAMFORD, Conn. — A building materials company here is planning to phase out a mainframe-based network in favor of a distributed net of Unix-based workstations linked via dial-up lines to IBM Application System/400s.

Lone Star Industries, Inc. is migrating from a costly leased-line network anchored by an IBM 3081 mainframe to a dial-up net, a move that promises to not only cut telecommunications costs, but to slash the network support staff by about 90%.

"For us, it's a cost-saving advantage," said Frank Careccia, Lone Star's vice-president and director of technical services. "We don't have to use point-to-point lines, and we're still able to communicate whenever we wish."

Key to the strategy is software from Emerald Technology, Inc. that lets Lone Star's AST Research, Inc. Premium 386 workstations, which run The Santa Cruz Operation, Inc.'s Xenix operating system, swap data with IBM AS/400s located at five regional sites and at company headquarters here.

Lone Star is a nationwide manufacturer of concrete, cement and other building materials, Careccia said. The company has more than 150 locations, most of which are plants where construction materials are produced.

The company still supports those remote sites with a network of dedicated lines tied to an IBM 3081 mainframe at a data center in Houston.

Users at terminals attached to Premium 386 workstations at the remote locations store financial, personnel and other data on the workstations, which establish IBM 3270 terminal-emulation sessions with the 3081 to upload the data.

To cut costs, the company embraced a new strategy about 18 months ago that is based on five profit centers, each acting as regional headquarters to support plants in their respective territories. AS/400s have already been installed at all but one of the profit centers and at headquarters.

Eventually, the AS/400s will

(continued on page 18)

CASE/Datatel's new CSU supports fractional T-1

By Paul Desmond
Senior Writer

CHERRY HILL, N.J. — CASE/Datatel, Inc. recently unveiled a channel service unit (CSU) that supports fractional T-1 lines but does not require a T-1 multiplexer.

CASE/Datatel's new DCP3555 T-1 CSU Plus obviates the need for a T-1 multiplexer at small sites when users want to tie those sites into a T-1 backbone via fractional T-1 lines. Traditionally, a CSU is used in conjunction with a T-1 multiplexer to support fractional T-1 circuits.

The product complements the savings that fractional T-1 provides in monthly line charges by reducing the cost of hardware required to support the service.

"This device makes it even easier for smaller users to get into the T-1 game," said Tom Hornsby, CASE/Datatel's director of marketing. "Before, they could save on the line because they'd only be paying for a fraction of the full T-1 line. Now, they can get a fraction of the full T-1 multiplexing equipment."

Normally, a T-1 multiplexer formats digital signals into individual DS0s for transport over a T-1 or fractional T-1 line, and the CSU is merely the interface to that line. But the DCP3555 does the DS0 formatting on its own, Hornsby said.

The DCP3555 would be used at the end of a tail circuit that feeds into a T-1 backbone, he said.

The product provides two ports. One supports a digital private branch exchange or other D4-framed device with a full T-1 output. The other is a V.35 or RS-422 interface that supports any synchronous device operating at a multiple of 56K or 64K bit/sec. That allows the data devices to take advantage of any DS0s not being used by the PBX.

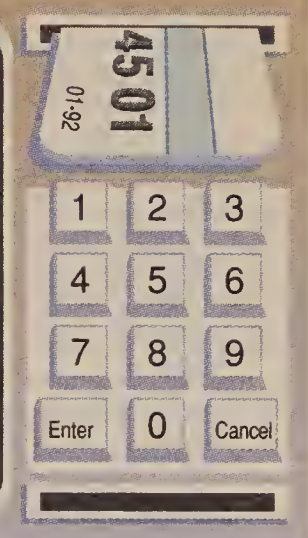
In that manner, users can attach local network bridges, computer-aided design and manufacturing workstations, video coder/decoders or other synchronous devices to the CSU and piggyback traffic from those devices over a fractional T-1 line along with PBX traffic.

The DCP3555 works with both

(continued on page 18)

ATM network giants

Owner	ATMs owned	Transactions (Thousands per month)
Citicorp	1,600	9,000
Security Pacific Corp.	1,557	9,000
Bank of America	1,552	17,000
First Interstate Bancorp	1,340	11,000
Wells Fargo & Co.	1,262	10,500
BayBanks, Inc.	1,232	9,900
Bank of New England Corp.	628	3,500
Mellon Bank Corp.	614	3,008
Barnett Banks, Inc.	560	3,216
U.S. Banc Corp.	552	2,700



GRAPHIC BY SUSAN J. CHAMPENY SOURCE: *BANK NETWORK NEWS*, CHICAGO

Terminals gain entry to rival mainframes

Protocol software helps state workers in Pa. tap into IBM and Unisys hosts from a single terminal.

By Paul Desmond
Senior Writer

HARRISBURG, Pa. — The commonwealth of Pennsylvania is meeting a growing need for information sharing among its various agencies with the help of IBM-blessed software that gives terminal users access to both IBM and Unisys Corp. hosts.

The network is helping Pennsylvania be more responsive to the needs of its citizens, said Nicholas Giordano, assistant director for the Bureau of Telecommunication Services in the Office of Administration. By giving workers access to multiple hosts, the state can speed information gathering and eliminate redundant data entry. The setup also obviates the need for workers to have both Unisys and IBM terminals, Giordano said.

The linchpin of Pennsylvania's network strategy is the communications center here, which is the termination point for multidrop lines supporting terminals throughout the state. The lines feed into an X.25 switching network — housed completely within the center — that is controlled by software developed for the commonwealth by Boeing Computer Services Co.

The Boeing software, which runs on a specially adapted Digital Equipment Corp. PDP-11/23 minicomputer, routes traffic to one of four Timeplex, Inc. Link/2 multiplexers for transport via T-1 lines to one of seven data centers located within a nine-mile area. Each center houses a mainframe, and any mainframe can be accessed from any terminal if the user has the proper clearance, Giordano said.

Within the X.25 net are personal computer-like processors running Sync Research, Inc.'s Presentation Conversion Server (PCS) protocol conversion software, which is comarketed by IBM. PCS converts an IBM 3270 data stream to the Uniscope protocol used by the state's two Unisys 1100 Series mainframes and, conversely, reformats Uniscope traffic into 3270.

That lets a user of either an IBM or Unisys terminal access ei-

PCS takes into account differences in screen formats between IBM and Unisys terminals.

▲▲▲

ther vendor's host. When protocol conversion is required, the Boeing software routes the data through one of the processors running PCS.

IBM entered into a joint marketing agreement with Sync Research in September to sell PCS. Pennsylvania, which has been using PCS since 1986, has an earlier version of the software than the one currently marketed by IBM but its functions are similar.

The PCS software does a better job converting Unisys and IBM protocols than competing products because it takes into account differences in screen formats between IBM and Unisys terminals, Giordano said.

(continued on page 18)

Terminals gain entry to rival mainframes

continued from page 17

Unisys offers conversion software that runs on its front-end processors, but Giordano said his tests of that software proved it would not meet the state's needs.

"[Unisys] does a good job translating protocols, but the screen formats — the application presentation — must be kept very simple because it does not try to cross-map and translate some of the non-compatible features," he said.

For example, Unisys terminals have a separate buffer for field control characters that control such screen attributes as blinking certain fields or allowing the cursor to hop automatically to specified fields, such as for data-entry applications. IBM does not have a separate buffer for such control characters, which it calls field attribute bytes.

"Sync's PCS does a good job of analyzing the screen format and, in effect, stealing available spaces out of the text to embed the IBM field attribute bytes," Giordano said. That means programmers do not have to change applications tailored for one vendor's terminal if the application is to be accessed by a user on the other vendor's terminal.

Demand for access to other agencies' applications is growing as users become aware of how such capabilities can improve productivity.

The first to benefit from the PCS product were users of IBM terminals that needed to access the state's Integrated Central Systems (ICS), which runs on a Unisys mainframe. That application supports personnel, payroll, budgeting, financial accounting and procurement for the state.

Another pilot project is under way to more closely integrate the state's IBM-based unemployment compensation programs with its Unisys-based Department of Public Welfare applications. The pilot is aimed at screening out redundant data collection and entry that occurs when the same people apply for both benefits, as is often the case, Giordano said.

"The departments are cooperating in an effort to do a joint collection of information and then separately screen the applications according to the requirements for each program," he said. That benefits both the agencies as well as the applicants, who no longer have to give the same information twice at separate locations.

CASE/Datatel's new CSU supports T-1

continued from page 17

the D4 format and extended superframe format (ESF), and is compatible with virtually all carriers' services, Hornsby said.

The CSU also provides a D4-to-ESF conversion unit for instances when the device is used with PBXs, channel banks or multiplexers that support D4 framing but not ESF. Support for ESF means the CSU can respond to carrier test messages, allowing the carrier to monitor the circuit from the central office.

On private networks, the DCP3555 can be used as a point-to-point limited-distance modem, supporting synchronous devices over four-wire facilities at distances of up to 6,000 feet.

Network management features are limited with the DCP3555 in comparison with a T-1 multiplexer, Hornsby said. The product monitors the performance of the T-1 link but does not support the full-blown bit error rate tests, loop-backs and other diagnostic capabilities of CASE/Datatel's T-1 multiplexers, he said. It supports console and printer ports that are used for system configuration and printing statistics.

Available now, the DCP3555 costs $3,175.

User opts for distributed net

continued from page 17

run all the applications now supported by the mainframe, Careccia said.

At remote plants, Premium 386 workstations collect accounting, payroll, personnel and other data and feed it over dial-up lines to another Premium 386 located at the nearest profit center.

To upload the data, the company uses Emerald's Blazer file-transfer software running on a Premium 386 workstation in each profit center. The Blazer software automates the file-transfer process by dialing the remote machine and restarting the transfer if there is a line problem; it also performs data compression, which saves line costs, Careccia said.

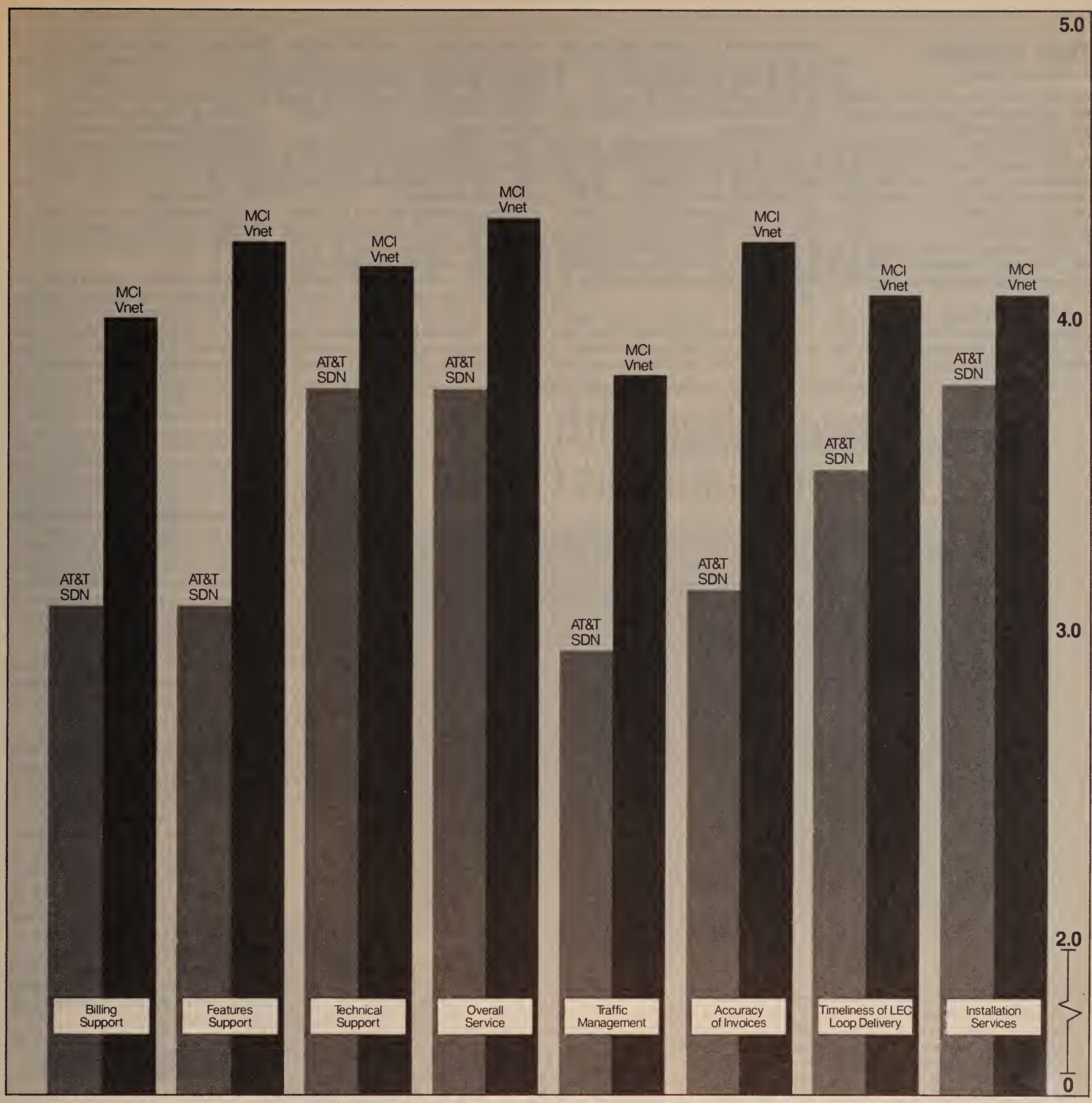
Once the data is at the profit center, it is transferred to an on-site AS/400 using Emerald's Handshake-Express protocol conversion software running on the Premium 386.

In addition to file transfer, Lone Star users at remote sites can run applications on the AS/400. A third Emerald package, Handshake-Emulation, supports IBM 5250-type terminal emulation so remote Xenix users can log on to an AS/400 to run applications that require more information than what is stored on their local machines. "It puts the user in charge of his own destiny," Careccia said.

Since many applications are run locally on the Unix processor, Lone Star wanted to make it easy for users to toggle between the Premium 386 and the AS/400 environments. Toward that end, it developed its own software that gives terminals attached to the remote workstations the appearance of a 5250-type terminal.

When deployment of the distributed network is complete next year, Lone Star will terminate the lease on its mainframe and associated software such as MVS and VTAM. It will also drastically scale back on network staffing.

"We will have reduced staff by about 90%," because supporting the AS/400 is a much easier chore than running a mainframe, Careccia said.



MCI Sweeps the Ratings.

It's official. The Yankee Group, one of the world's leading telecommunications consultants, asked virtual network users to rate their long distance companies on a five-point scale. The results: MCI® customers rated Vnet higher than AT&T customers rated SDN, across the board.

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Independent survey results and methodology are available in the Yankee Group report "Virtual Networks: The Hybrid Solution," © 1989.

Data Packets

continued from page 17

dle its growing network and to support new high-bandwidth applications such as imaging, Holloran said.

In addition, because the StrataCom IPXs do not require users to dedicate bandwidth to voice or data, they are well-suited to handle the bursts of traffic coming from the local-area networks Covia is installing at travel agent sites.

Covia would not disclose the value of the contract or the company's expected savings with the new network.

Northern Telecom, Inc. last week announced software enhancements for its DPN-100 packet switches that enable the switches to support virtual private networks, as well as a feature that lets IBM Systems Network Architecture hosts dial out to remote, low-volume sites.

The enhancements are included in Northern Telecom's DPN-100 Generic 25 (G25) software.

The virtual network capability will let companies with private DPN-100 nets create subnetworks dedicated to departments, divisions or dictated by geography. Subnet administrators will have control over moves, changes and other management aspects of the networks. Although still physically part of the larger network, the virtual net appears autonomous to its administrator.

Public net providers can use the same feature to logically subdivide their networks, giving each user a virtual network.

The new SNA/SDLC Dial-out feature lets an SNA host in a DPN-100 network place calls to remote devices through switched telephone connections. Previously, remote devices could dial into an SNA host, but the host could not initiate a dial-out session.

When making a dial-out call, the DPN-100 network will initiate the switched call from the closest node to the target site to save on phone charges.

Besides obviating the need for leased lines to some sites, the feature can be used to back up leased lines.

Also new with G25 is support for the CCITT E.164 Numbering Plan standard, which is a 10-digit dialing plan originally designed for Integrated Services Digital Networks. The plan lets users employ traditional telephone company numbering schemes for data connections. Previously, DPN-100 nets supported only the X.121 standard, which is a 14-digit dialing plan. Now, DPN-100 nets can support a mixture of both plans in the same network.

Northern Telecom also said G25 will support X.25 gateways between public and private packet networks. Previously, DPN-100 users needed a separate, stand-alone gateway device to link a DPN-100 net to a public data network.

G25 is available now. DPN-100 users can upgrade to the new software for 12% to 15% of what they paid for G24 software.

Avanti Communications Corp. last week announced new diagnostic capabilities for its Open Network Exchange (ONX) 2000 T-1 multiplexer that support status monitoring of T-1 links that use D4 framing. The company said the monitoring capabilities mimic those provided by the extended superframe format (ESF), which lets users and carriers diagnose T-1 links.

Although users typically need a stand-alone test device to glean diagnostic ESF data, Avanti said its ONX 2000 is the first multiplexer to capture that data on its own.

The ONX 2000 will also provide ESF-like monitoring capabilities for lines that do not support ESF. The multiplexer will constantly monitor the line for events such as frame and bit errors, alarm signaling and clock slips, then provide statistics at one-minute, 15-minute and one-hour intervals. It will report the information collected to the user via Avanti's Open Network Management System.

Available now, the ONX 2000 software upgrade that supplies the new capabilities is free to existing users. ONX 2000 pricing starts at $19,975.

GE Information Services last week announced that it will expand the number of U.S. sites that support 2,400 bit/sec asynchronous dial-up access to its services from 69 to 393 by the end of 1989.

Also last week, GE Information Services eliminated the $1-per-hour 2,400 bit/sec access surcharge for its Mark*Net value-added network (VAN) service, making the price for 2,400 bit/sec VAN access $4.80 per hour, the same as that for 300 and 1,200 bit/sec access. That price varies depending on city and time of day.

The company also announced it is field testing 9.6K bit/sec V.32 asynchronous dial-up service and expects to deploy the service in early 1990.

To get information on products or services advertised in this week's issue of *Network World*, see the FAXNeT Form on Page 41

FAXNeT

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MNP Class	9	5	10
Modulation standards	CCITT V.32, V.22bis, Bell 212A, 103	CCITT V.32, V.22bis Bell 212A, 103	V.22bis Bell 212A, 103
100% error free	Yes	Yes	Yes
UUCP Protocol Support (UNIX)	No	Yes	No
Kermit Protocol Support	No	Yes	No
Remote Access	Yes	Yes	Yes
MNP Password Connection Security	No	Yes	Yes
Price	$1,599	$1,199	$699

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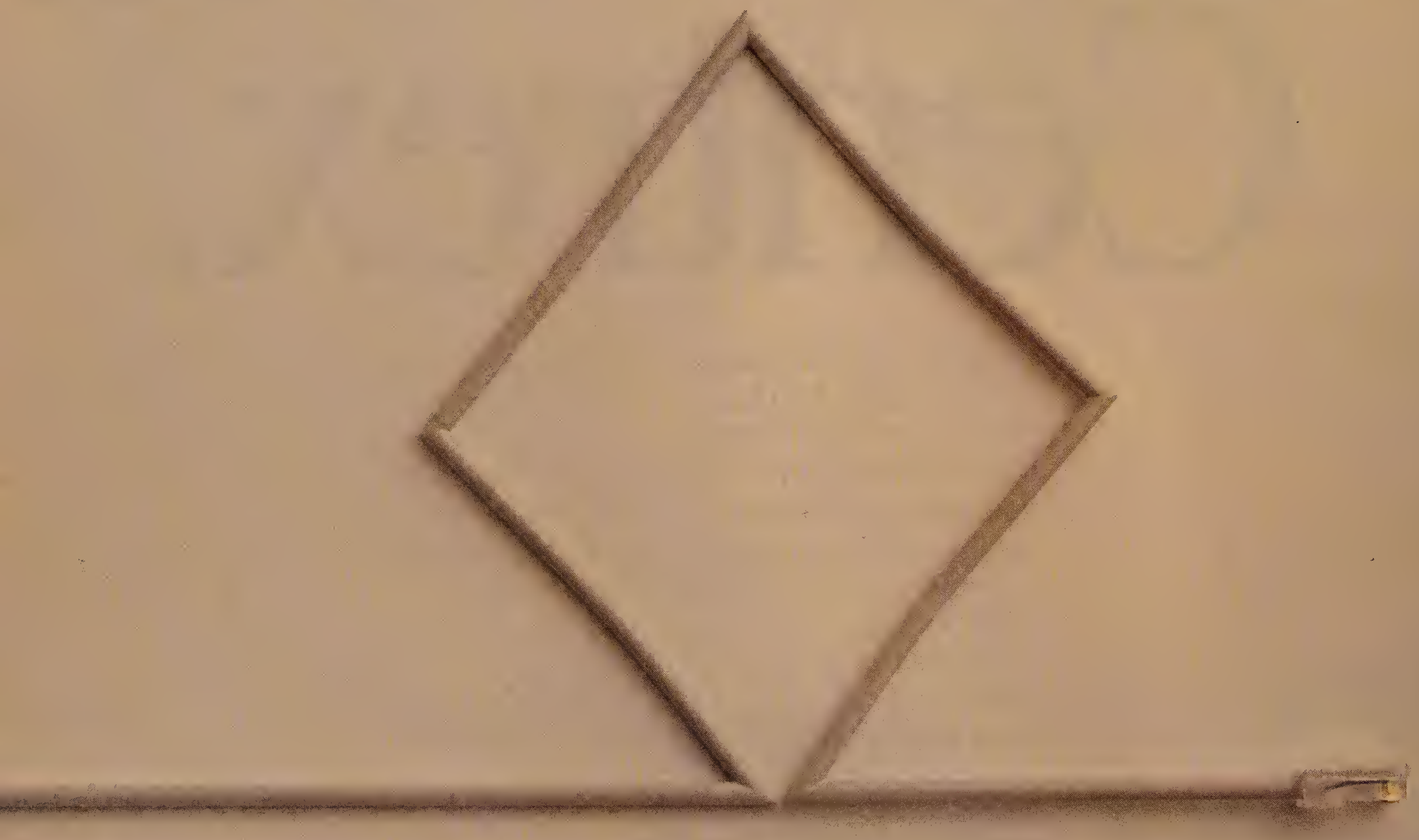

LATTISNET SYSTEM 3000

Your local area networks grow more valuable over time. More and more, they're expected to deliver a multi-faceted, highly sophisticated utility service. The more complex they get, the more you want an integrated, flexible system that satisfies your connectivity requirements.

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See the FAXNeT Form on Page #41

Worth Noting

"Arcnet is the flea market of the LAN industry. It's not a mainstream product, but when users want a bargain basement network featuring good performance, they buy Arcnet and it works."

J. Scott Haugdahl
Senior technical consultant
Architecture Technology Corp.
Minneapolis

Netnotes

Laser Communications, Inc. recently introduced a short-haul laser link that can be used to connect token-ring local-area networks in a metropolitan area to form a single logical ring.

The LACE L00-19 supports 4M bit/sec point-to-point links, enabling a single logical token ring to span multiple physical locations. Distances supported range up to one kilometer.

The product supports full-duplex transmissions, emitting and receiving light signals at the same time to achieve the full token-ring data rate. No Federal Communications Commission licensing is required.

"With the LACE L00-19, we can ensure that remote users are connected to the network without the degradation in speed or response time associated with modem or standard phone line connections, which typically operate at 9.6K bit/sec," said Michael Berman, director of marketing.

The product functions as a physical-layer repeater, so it is transparent to the token-ring data stream. Switches on the rear panels of transceivers are used to configure the devices to interface with a token-ring multistation access unit (MAU), a station port or directly to a station.

The product is compatible with the IEEE 802.5 and IBM token-ring standards. The LACE L00-19 costs $26,350 for a pair of units.

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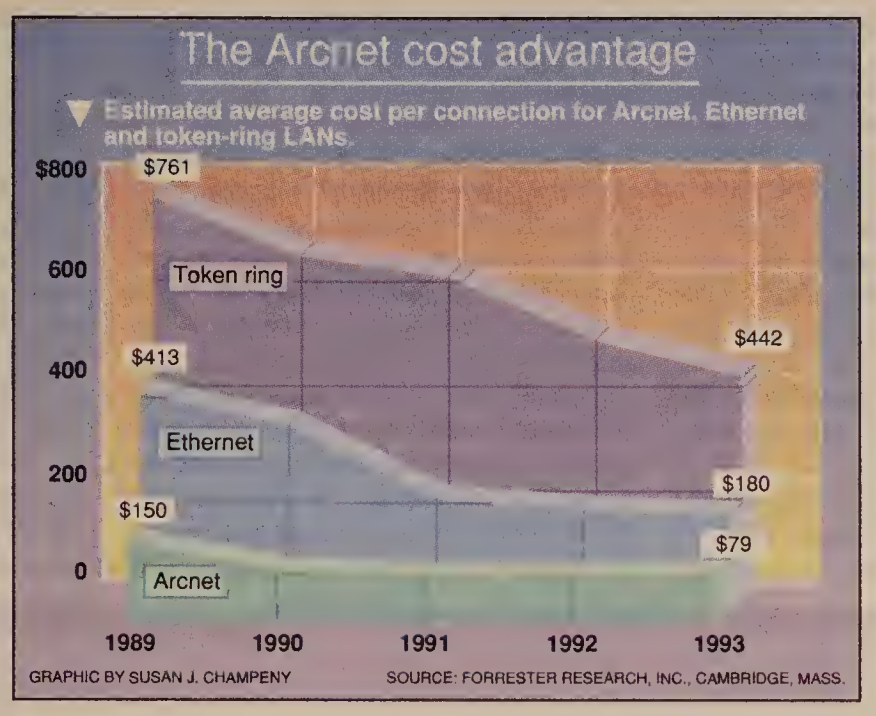

Arcnet quietly takes its place in history

With mounting vendor support, the technology stands poised to battle token ring and Ethernet.

"The question is not whether the 20M bit/sec Arcnet Plus is a viable LAN technology that works, but whether or not users will buy it."

Doug Gold
Manager of communications research
International Data Corp.
Framingham, Mass.

By Laura DiDio
Senior Editor

The year 1990 is shaping up as *the* watershed year in Arcnet's 13-year history.

At least 15 vendors are readying 20M bit/sec implementations of Arcnet, which are due out by midyear, that they hope will staunch the flow of defectors to Ethernet and token-ring local-area network technologies.

Equally important, a consortium of 100 vendors and users — under the auspices of the two-year-old Arcnet Trade Association (ATA) — is proposing Arcnet for consideration to ANSI.

Together, these developments will determine whether Arcnet remains a niche technology or becomes a mainstream, less expensive alternative to Ethernet and token-ring LANs, said analysts and industry observers.

The 2.5M bit/sec Arcnet was first introduced by Datapoint Corp. in 1977, a few years before Ethernet hit the market. Since its introduction, Arcnet has quietly accrued an installed base of more than two million nodes and currently accounts for about 17% of LAN sales and as much as 30% of the installed LAN nodes.

Although early to market, one of the primary factors in Arcnet's continued survival is that the current 2.5M bit/sec Arcnet adapters cost 30% to 60% less than 10M bit/sec Ethernet cards.

According to J. Scott Haugdahl, senior technical consultant at Architecture Technology Corp., a technical, publishing and consulting firm in Minneapolis, Arcnet adapters range in price from $80 for a low-end 8-bit board for Personal Computer XT-type microcomputers to about $400 for a high-end 16-bit Micro Channel Adapter. "That's roughly 30% to 60% less than Ethernet adapters, which range from about $200 to $600," he said. "And Arcnet hubs are about two to three times less expensive than Ethernet multiport repeaters."

PC LAN forecast

1990

	Shipments (in thousands of units)	Revenue (in millions of dollars)
Ethernet	2,341	$936.0
Token ring	1,600	$960.1
Arcnet	895	$183.5
LocalTalk	722	$54.1
Other	369	$144.1

SOURCE: INTERNATIONAL DATA CORP., FRAMINGHAM, MASS.
GRAPHIC BY SUSAN J. CHAMPENY

Arcnet is also flexibile. It supports coaxial cable, shielded and unshielded twisted-pair and fiber-optic cable, features a deterministic token passing scheme and can be configured in a star or bus topology. It is also highly reliable, especially for small packet transmissions, which characterize data entry applications such as processing insurance and health claims.

(continued on page 27)

Castelle boosts FaxPress server with E-mail gateway

MHS-based offering slated for January availability.

By Susan Breidenbach
West Coast Bureau Chief

SANTA CLARA, Calif. — Start-up Castelle is planning to enhance its FaxPress facsimile server next month with the release of an electronic mail gateway for the product.

Designed specifically for the NetWare environment, FaxPress is a dedicated fax server that lets network users send and receive fax messages. It also doubles as a print server, supporting network printing and fax output to attached printers.

The new gateway will be based on Action Technologies, Inc.'s Message Handling Service (MHS) — a store-and-forward mechanism that Novell, Inc. is promoting as a standard for E-mail systems. MHS enables users of any MHS-compatible E-mail package to send messages across a NetWare local-area network to the FaxPress for transmission to any Group III facsimile machine.

With the current FaxPress server, fax jobs are submitted as if they are Hewlett-Packard Co. LaserJet print jobs, and FaxPress converts the LaserJet file to fax format before transmission. With the addition of the E-mail gateway, FaxPress will let users attach LaserJet-formatted attachments to E-mail messages for faxing.

Using a LaserJet-formatted file rather than a scanned image of a paper document results in higher resolution at the receiving end. "The quality of the outgoing faxes is outstanding," said John Foy, director of office automation for Wilson, Sonsoni, Goodrich and Rosati, a law firm in Palo Alto, Calif., that uses FaxPress.

The FaxPress includes a built-in fax modem, an Ethernet connection, two Motorola Corp. 68000 processors, parallel and serial printer ports, and software. A version with 2.5M bytes of memory is priced at $4,000, and a 4.5M-byte model is $4,700.

The MHS E-mail option is expected to be available in January for $495. Users who buy a FaxPress by the end of the year will receive a coupon for a free copy of the MHS software.

HP to test net interfaces, other boards for EISA PC

By Tom Smith
New Products Editor

LAS VEGAS — Hewlett-Packard Co. recently announced that it will test 27 accessory boards, including products from local-area network vendors, for compliance with the Extended Industry Standard Architecture (EISA) bus in its Vectra 486 personal computer.

HP plans to publish by the first quarter of 1990 a list of the vendors whose products are compatible with the Vectra 486, which was unveiled in October, said Ronald Avignone, future products manager for HP's Personal Computer Group in Sunnyvale, Calif.

All but two of the 27 companies' products to be tested plan to have goods available in the first quarter of 1990, the target availability date for the Vectra 486. LAN vendors participating in the test include Novell, Inc., Proteon, Inc. and Racal InterLan.

All 27 products will be tested for their support of everything from Ethernet, token-ring and Fiber Distributed Data Interface LANs to Small Computer System Interface and Enhanced Small Device Interface host adapters and high-resolution graphics adapters.

Nineteen of the boards will be bus master cards, Avignone said. Bus master cards are capable of taking control of the microcomputer's bus to achieve higher card-to-host throughput.

HP declined to reveal any specifics of the tests, citing competitive reasons.

Initial testing will likely be conducted using Novell's NetWare 386 network operating system because many board manufacturers write drivers for it, Avignone said.

Other operating systems likely to be tested in the future include Unix, Avignone said, but plans have not been finalized. The company may also test the LAN Manager/X operating system being championed by HP if the board vendors write drivers for that operating system.

The EISA card vendors have provided HP with prototypes of their cards and some have been given HP's Vectra 486 for development purposes.

"Having a close relationship with these companies is the best way to make our products compatible," Avignone said.

Netnotes

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For more information, contact Laser Communications at 1848 Charter Lane, Suite F, Lancaster, Pa. 17605; (800) 527-3740.

Sun Microsystems, Inc. said last week it will open its first European network research and development center just outside of Paris within the next two months. The new center, called the International Center for Network Computing, will focus on incorporating Open Systems Interconnection into its SunNet product family.

Lotus Development Corp.'s Lotus 1-2-3 spreadsheet is being integrated into **Concord Communications, Inc.'s** MAPware manufacturing products as a result of a recent agreement.

The resultant software, called Factory, will enable shop floor operators, engineers and managers to access real-time factory data from within a Lotus 1-2-3 spreadsheet. Users got a taste of this capability at the recent Autofact '89 show in Detroit, where Lotus demonstrated a 1-2-3 application for tracking components.

Pricing and a scheduled release date for Factory have not been announced. Concord, based in Marlborough, Mass., said it plans to make a formal product announcement early next year.

For more information, contact Concord at 753 Folsom St., Marlborough, Mass. 01752; (508) 460-4646.

A multiport Ethernet transceiver that does not require external alternating current power is now available from **Garrett Communications, Inc.** of Santa Clara, Calif. The GCi-420 Fan-Out Transceiver has four standard AUI connectors for workstations and a network port. Workstations can be located as far as 50 meters away from the Ethernet trunk.

Since no external power is required by the GCi-420, the unit can be placed anywhere, regardless of whether an electrical outlet is available. The product is priced at $540 and comes with a two-year warranty.

Contact Garrett Communications at 3375 Scott Blvd., Santa Clara, Calif. 95054; (408) 980-9752.

The Software Link of Norcross, Ga., recently announced gateway software to link its DOS-compatible PC-MOS multiuser operating system to Novell, Inc.'s NetWare.

PC-MOS enables an 80386-based personal computer to support as many as 16 dumb terminals. The new PC-MOS Gateway is a software shell that lets the terminals communicate with devices in a NetWare (Versions 2.1 and above) LAN.

Each terminal is assigned a separate partition, or memory space, in the PC-MOS system. With the help of the gateway software, NetWare recognizes each partition as an individual network workstation.

Since terminals are much less expensive than personal computers, the PC-MOS Gateway provides users with a way to expand existing NetWare LANs with a minimal hardware investment. The software is available now for $195.

The Software Link is located at 3577 Parkway Lane, Norcross, Ga. 30092, or call (404) 448-5465.

3Com Corp. recently announced its first brouter, an internetworking product that can perform protocol routing and protocol-independent bridging concurrently.

3Com said the BR/2000's $5,495 price tag makes brouters cost-effective for Ethernet internetworking. The product can operate as a protocol-transparent bridge; as a router supporting Transmission Control Protocol/Internet Protocol, Open Systems Interconnection and Xerox Corp.'s Xerox Network Systems protocols; or as a brouter routing these procotols.

This multiple functionality lets network managers use routing technology to create more manageable independent subnetworks while supporting nonroutable protocols — such as Digital Equipment Corp.'s Local Area Transport and IBM's LU 6.2 and Network Basic I/O System protocols — via bridging.

The BR/2000 will include software agents for the Simple Network Management Protocol and the Common Management Information Protocol over TCP/IP (CMOT), enabling administrators to manage the device from net management systems based on either standard.

The product is scheduled for release in March 1990.

Thomas-Conrad Corp. of Austin, Texas, recently introduced Arcnet adapters for the Macintosh SE and SE/30, and a token-ring bus-master interface for machines based on IBM's AT bus.

The Macintosh ARC-Cards will be available with a choice of high-impedance coaxial, twisted-pair or fiber-optic interfaces. The coaxial boards support a 1,000-ft. bus topology containing up to eight workstations. The twisted-pair adapters support spans of 800 feet, and workstations connected via the fiber-optic boards can be as far as 8,000 feet apart.

The ARC-Cards will be available in the first quarter of 1990. Prices start at less than $500 for the twisted-pair and coaxial versions.

The TC4035 is a 4M bit/sec token-ring adapter that uses a 16-bit data bus and bus-mastering technology to achieve maximum data-transfer speeds. Performance is further enhanced by accelerated drivers for Novell, Inc.'s NetWare 2.1 or higher. These drivers bypass the adapter handler interface, providing direct communications with the on-board memory.

The TC4035 is expected to be available in the first quarter of 1990 for $595.

Thomas-Conrad is located at 1908-R Kramer Lane, Austin, Texas 78758, or call (800) 332-8683.

Arcnet quietly takes its place in history

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But despite these features, even ardent supporters admit that Arcnet has been the invisible network.

"We're one of the best kept secrets in the LAN industry," acknowledged Ernest Wassmann, chairman of ATA and director of product marketing at Esprit Systems, Inc. in Melville, N.Y.

"It comes as a surprise to most people when you tell them that we have over two million nodes installed — about one million during 1989 alone — and that there are over 70 vendors manufacturing Arcnet products," he said.

Unfortunately, Arcnet's advantages have been overshadowed by two major drawbacks: It is not an accepted standard like IEEE 802.3 Ethernet or IEEE 802.5 token ring, and it lacks the backing of a major computer vendor such as IBM (token ring) or Digital Equipment Corp. (Ethernet).

Making up for lost time

"Datapoint made a big mistake in not promoting Arcnet as a standard in the early 1980s," Haugdahl said. "They missed their chance to be part of the IEEE 802 along with IBM and Xerox Corp."

But the ATA, with the backing of about 100 users and vendors, is now trying to rectify the latter omission, according to Wassmann.

A draft standards proposal is currently being distributed to the ATA Standards Committee, and the ATA plans to submit it for consideration as an ANSI standard next April, Wassmann said.

"This isn't going to be a long, drawn-out process," he said. "We hope to have the basic standard approved for the 2.5M bit/sec Arcnet implementation by June, with standards approval for the forthcoming 20M bit/sec version to follow shortly afterward."

Additionally, at least 15 vendors, including Datapoint, Standard Microsystems Corp., NCR Corp.'s Microelectronics Division, Performance Technologies, Inc., Network Innovations Corp. and PureData, Ltd., are readying 20M bit/sec Arcnet Plus chips and adapters for June introductions.

Besides the nearly tenfold increase in data transmission speed, the upcoming 20M bit/sec Arcnet Plus products will be fully interoperable with the two million 2.5M bit/sec Arcnet nodes in operation today.

By contrast, the 4M and 16M bit/sec versions of the token-ring standard are compatible but not interoperable, according to Haugdahl. This means that users who have both 4M and 16M bit/sec token-ring nets installed at their sites must also have a separate personal computer configured as a bridge between the networks to compensate for the disparate transmission speeds.

"The 20M bit/sec Arcnet Plus implementation that the ATA is proposing will enable users to create a single physical network in which some nodes are transferring data at 2.5M bit/sec while others are transmitting data at the 20M bit/sec rate of Arcnet Plus," Haugdahl explained.

Arcnet Plus will also feature a 48-bit addressing scheme, compared with an 8-bit addressing scheme for the current Arcnet. The 48-bit scheme will enable Arcnet Plus to support more nodes on a single network, Wassmann said.

"The current 2.5M bit/sec Arcnet can support up to 255 nodes on a single network," he said. "Theoretically, Arcnet Plus will be able to support up to 2,047 nodes on a single network."

Wassmann qualified that figure, noting that, in reality, the number of nodes supported is subject to the physical limitations of the server, the network operating system and the particular applications.

And while pricing will be determined by individual vendors, Wassmann predicts that 20M bit/sec Arcnet Plus adapters will have price tags comparable to those of 10M bit/sec Ethernet cards.

"The price of a 20M bit/sec Arcnet adapter should be [in the] $495 to $695 range, which is comparable to the [current] price range for Ethernet adapters," Wassmann noted.

To buy or not to buy?

While industry analysts don't dispute the merits of either the current 2.5M bit/sec Arcnet or the forthcoming 20M bit/sec Arcnet Plus, the question remains whether users will buy it.

Mike Cahill, a telecommunications planner at Lockheed Aeronautical Systems Co., a division of Lockheed Corp. in Burbank, Calif., said his firm has been using Arcnet for the past three years and will consider migrating to Arcnet Plus.

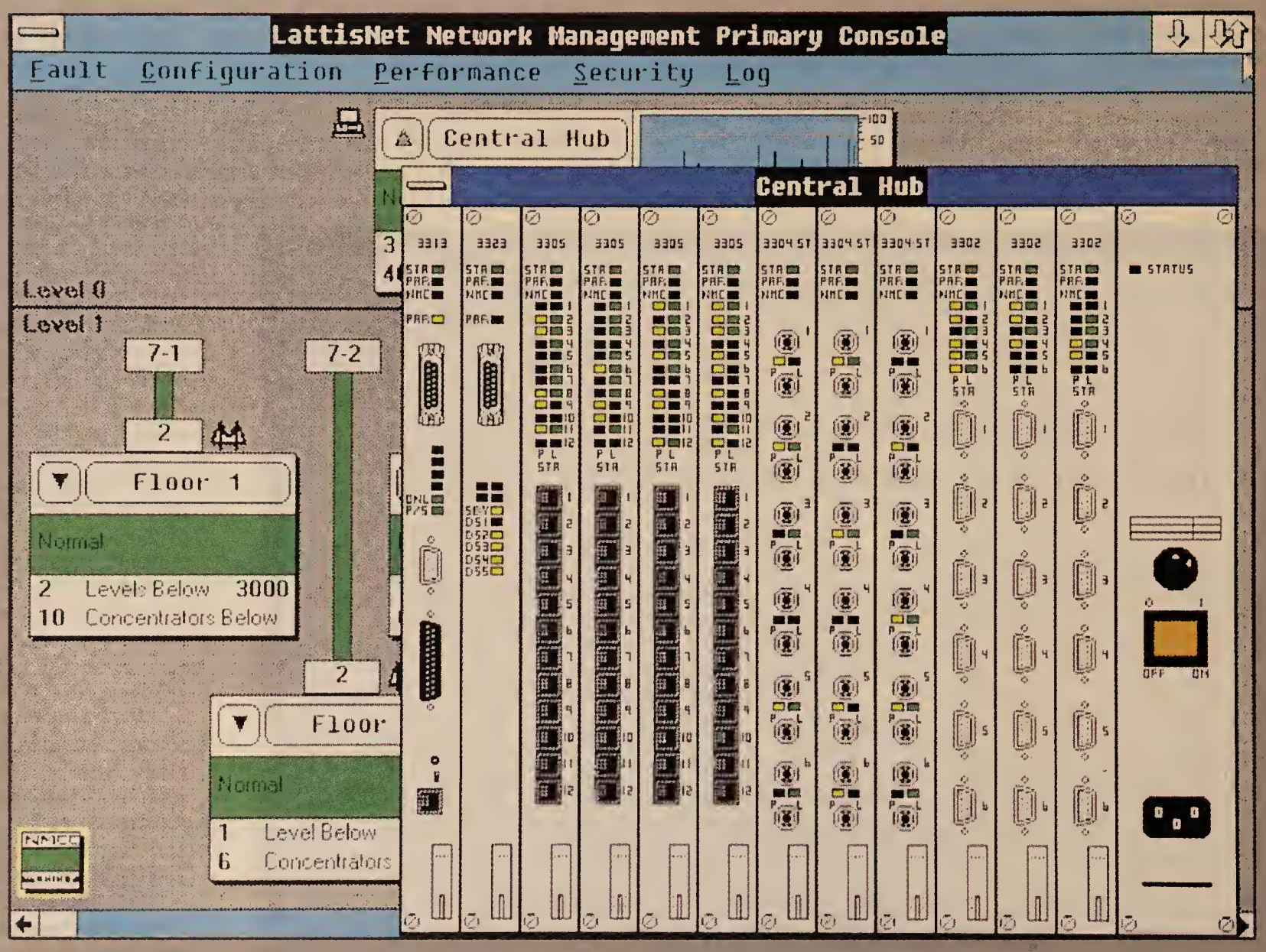
"We're going to try and standardize on two or possibly three LAN architectures companywide for simple economic reasons. So in that sense, we're committed to Arcnet, at least temporarily," Cahill said. "It's installed and operational here; if it weren't, Arcnet would be hard pressed to gain any foothold."

Maurice Klapfish, a division manager at Venture Development Corp., a consulting firm in Natick, Mass., said, "From all indications, we think Arcnet Plus will be successful as an upgrade to existing Arcnet users. It at least has the first shot. However, it's going to be hard to get existing Ethernet and token-ring vendors to switch to Arcnet."

"On a scale of one to 10, I'd rate Arcnet Plus' chances of success a fighting three," Haugdahl said. "It's going to be an uphill battle trying to compete for market share against Ethernet and token ring, both of which are firmly entrenched standards."

"But Arcnet and Arcnet Plus will appeal to cost-conscious users," he added. "If vendors can sell it at the same price as the 2.5M bit/sec version, then it has a good chance of achieving market penetration."

MAXIMIZE NETWORK UP-TIME



The expanded view features a detailed, real-time display of a LattisNet System 3000 concentrator.

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SynOptics Communications, Inc.

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SynOptics Communications, Inc., Dept. 600, 501 East Middlefield Road, Mountain View, CA 94043-4015 (415) 960-1100

See the FAXNeT Form on Page #41

Dialogue

Several states, including California and New York, are implementing telephone company incentive rate regulation that incorporates such features as price caps, profit sharing and flexible pricing. Do these incentive plans benefit users?

"There is a trend among states to revise regulations, but it's unclear whether the new plans are benefiting users.

"It appears that local politics more than anything else determines what groups benefit the most from regulatory changes. Most new regulations contain concessions to many different local interest groups. Only a close reading of the regulations, which are often hundreds of pages in length, will expose whether there are any clear winners or losers."

John LeGapes
Managing director
Program on Information Resources Policy
Harvard University
Cambridge, Mass.

"You have to look at incentive plans on a case-by-case basis. Not all incentive plans are the same; each state incorporates different features that may be lumped together under the heading of incentive regulation. Large users would rather have unregulated local service so they can deal directly with the phone company. All regulation, including incentive plans, involves complicated pricing and accounting procedures, which make it difficult for users to ascertain the relationship between price and cost."

Kenneth Phillips
Vice-president of telecommunications policy
Citibank, N.A.
New York

"On one hand, telecommunications costs are declining overall, and the local exchange carriers should have a strong incentive to push their costs down. On the other hand, the phone companies provide monopoly services, which argues for traditional rate-of-return pricing. The recent case in New York shows what happens when the equation doesn't work out. There is no simple answer."

Len Evenchik
Director of data communications
Office of MIS
Commonwealth of Massachusetts
Boston

Quality is the watchword for Westinghouse net unit

Extra effort boosts performance, user satisfaction.

By Barton Crockett
Senior Editor

PITTSBURGH — How does a corporation renowned for quality manage its networks?

Very carefully, according to Thomas O'Toole, a director in Westinghouse Corp.'s Communications Systems Division, based here. O'Toole said an ongoing network quality effort undertaken by his organization has increased network uptime, decreased the number of trouble reports and improved user satisfaction with the firm's network.

Westinghouse was one of three companies to receive the Malcom Baldridge National Quality Award from the Reagan administration in 1988. According to O'Toole, the award recognizes a corporate culture that values quality above just about everything else. "In Westinghouse, quality is a religion," he said.

O'Toole said the communications division works hard to make quality a reality in its own operations. The most recent network quality initiative began about five years ago, when Westinghouse developed its own network management system.

Different components of this application run on an AT&T 3B2 minicomputer, a Digital Equipment Corp. VAX and a Sun Microsystems, Inc. workstation networked via Transmission Control Protocol/Internet Protocol links. It tracks trouble tickets, manages call detail records and uses expert systems technology to pinpoint the cause of alarms.

"We built this ourselves because five years ago, there wasn't an off-the-shelf product that did what we wanted," O'Toole said. "I still don't think there is."

Since then, the quality program has been extended to include careful tracking of network performance, proactive testing to detect problems and the development of a close working relationship with vendors.

Two technicians from each of the major three long-distance carriers work full-time in Westinghouse's network control center, which is manned around the clock by about 18 vendor and Westinghouse employees. These technicians work to resolve problems in cooperation with the vendors' net operations personnel.

"We haven't required the vendors to do this; we just negotiated it with them," O'Toole said. "We think it enables us to get things fixed faster."

Westinghouse also publishes a

(continued on page 30)

EXECUTIVE BRIEFS

BY WAYNE ECKERSON

Greater communications spending. Communications spending is taking a larger slice of companies' information systems (IS) pie, according to a recent study. Most companies expect to spend more on local-area networks, data communications and communications software in 1989 than they did last year. These expenditures will account for much of the growth in 1989 IS budgets.

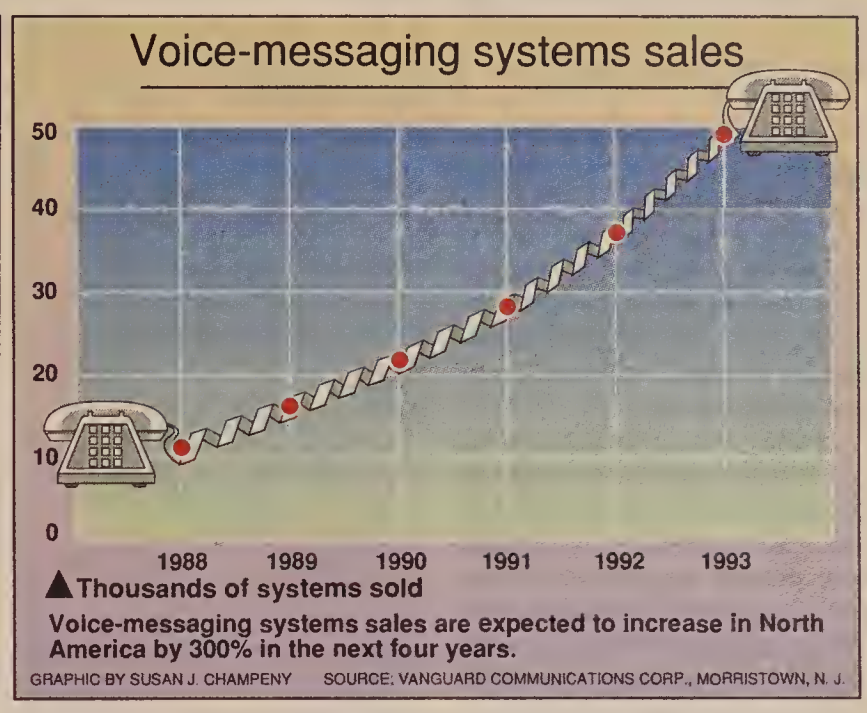
The study was based on a membership survey conducted by the Association of Systems Management, a Cleveland-based association of IS managers that has 100 chapters in the U.S. and Canada. The survey drew responses from 160 mid-level IS managers representing a broad range of industries.

Overall, communications expenditures constituted 9% of the 1988 IS budgets for the companies surveyed (see chart, page 30). That percentage will increase for 1989, the study indicated. More than 60% of the managers surveyed said their companies plan to increase spending for LANs, communications software and data communications this year.

In addition, almost half of those surveyed said their companies will increase spending on voice communications, and 35% said their companies will spend more on telecommunications staff salaries. Just over one quarter said their companies will increase expenditures for wide-area nets.

The results indicate that companies are beginning to move away from centralized systems and toward distributed processing, the study said. Most companies are distributing information

(continued on page 30)



Misuse of voice mail limits its usefulness

Voice messaging can increase productivity, but lack of training, poor deployment cause problems.

By Wayne Eckerson
Senior Writer

While companies are purchasing voice-messaging systems at a healthy clip, few users know how to implement and administer the systems properly, often causing a breakdown in company communications.

Many top executives have ordered the systems to be turned off because staff members became virtually inaccessible behind the automated system and customers complained about receiving poor service.

Most of the problems associated with voice messaging, however, can be avoided, according to users and consultants interviewed by *Network World*. Many companies fail to plan in detail how their system should be used, and they neglect to train users or update mailbox addresses when employees change locations or join the company.

"Voice messaging has gotten a poor reputation in corporate America because companies don't implement the systems properly," said Lucille Dwyer, senior director at Vanguard Communications Corp., a Palo Alto, Calif., consulting firm specializing in voice messaging.

Users say companies often don't realize the significant benefits of voice messaging because they use the systems mostly as telephone answering systems.

Ideally, voice messaging can save employees time and increase productivity because it enables them to deliver messages to colleagues' electronic mailboxes instead of trying to contact them directly. Electronic mailbox owners can pick up and respond to messages at their convenience. Direct calls often waste time because the person being called is on the phone, out of the office or doesn't want to be interrupted.

When used properly, voice messaging creates an off-line communications facility that eliminates telephone tag and reduces the volume of incoming calls, users said.

Unfortunately, most companies make the mistake of deploying voice systems primarily as a way to answer incoming phone calls, not for voice messaging. As a result, many users learn to see voice-messaging systems as "one big answering machine," according to Diana Santacroce, telecommunications systems manager at Connecticut Mutual Life Co. in Hartford, Conn.

> "Voice messaging has a poor reputation because firms don't implement it properly."
>
> ▲▲▲

This creates problems if users don't return calls quickly or leave detailed messages concerning their whereabouts, Santacroce said. Frustrated callers quickly develop the impression that people are using the voice system to screen calls.

That can lead to complaints from customers that often force top executives to abandon their investment in the system or fork over more money to retrain staff.

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Executive Briefs

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resources, such as data bases and applications, to LANs at remote sites instead of housing these resources at a central data center.

Stepping out and moving up. Corporations have long considered communications a back-office function, but that is changing, especially as companies discover the strategic importance of intercompany communications systems, such as electronic data interchange.

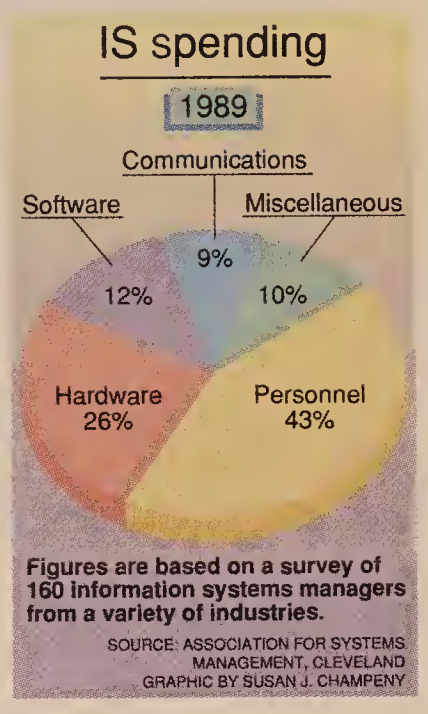
Senior executives are looking to network managers to build and manage intercompany communications systems that are critical to gaining a competitive edge in the next decade, according to a recent study conducted by The Diebold Group, Inc., a New York-based international management consulting firm specializing in information technology.

Chief executives are eager to interconnect with trading partners to engage in joint ventures or to improve operating efficiencies through the use of technologies such as EDI.

The study says network managers will consult with senior executives in a number of different capacities.

Network managers will work with:

- Top management to build better relationships with suppliers using networks.
- Chief information officers to develop interorganizational systems.
- Information system heads to coordinate intracompany application sharing among dispersed geographic units.
- Project teams to determine network applications that can assist their development efforts.



In the dark. Employees won't confide in their bosses when marital difficulties, financial problems, or a drug or alcohol dependency affects their work performance.

That's according to a recent survey by Adia Personnel Service, a Menlo Park, Calif.-based placement agency. The survey polled 1,285 human resource managers in U.S. companies.

Seventy percent of those surveyed said employees are unlikely to approach their supervisors when marital or financial difficulties are affecting their work performance.

Workers are even less likely to discuss a drug-related problem. Ninety percent of those surveyed said employees will keep a drug problem from their supervisors even when it's interfering with their performance.

However, employees are less reticent to discuss serious illnesses or problems with their children, according to the survey.

UCC submits EDI standards to ANSI X12 for approval

By Wayne Eckerson
Senior Writer

DAYTON, Ohio — The Uniform Code Council (UCC) recently agreed to submit its industry-specific electronic data interchange standards for approval to ANSI's X12 committee, which oversees the development of cross-industry EDI standards.

The move paves the way to create a single U.S. EDI standard set and gives the U.S. a stronger position from which to negotiate international EDI standards.

The UCC plans to submit about half of its 32 standards for adoption as full X12 standards. It's proposing that its remaining standards be scrapped in favor of similar existing X12 standards.

The UCC will modify the standards it is submitting to the X12 membership to conform with X12 syntax. The full ANSI X12 membership is scheduled to vote on the UCC proposal this June.

"The agreement will make life much easier for users because it provides them with one set of EDI standards instead of two or three," said Harriet Rusk, president of the Data Interchange Standards Association, the ANSI X12 secretariat, in Alexandria, Va.

The UCC oversees the development of EDI standards for the grocery and warehouse industries. These standards consist of the Uniform Communications Standard (UCS) in the grocery industry and the Warehouse Information Net Standard used by public warehouses.

Many grocery and warehouse companies have expanded their use of EDI to include companies outside their industries. This has forced users to support both ANSI X12 standards for communicating with companies in other industries and UCC standards for intraindustry communications. UCC and ANSI X12 use a slightly different syntax, which makes the standard sets incompatible.

The recent agreement represents the fruit of several years of discussion between UCC and ANSI X12 to align their standards and alleviate users from the burden of supporting multiple incompatible standards.

Under the agreement, ANSI X12 will establish a new subcommittee for distribution and warehousing that will maintain X12-approved UCS standards and all future X12 grocery and warehouse standards.

The UCC will ensure a smooth migration from UCC to X12 standards to avoid disruptions to users, said Jim Muenz, UCC's EDI technical director. He added that the UCC plans to play an expanded role in the future as it represents the needs and interests of UCC members within X12.

Misuse limits usefulness

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Santacroce said many companies run into problems because they fail to train employees how to use the new systems for voice messaging. And once a system is in place, it's hard to break people's habits, she said.

Restarts and voice mail jail

Shortly after Johnson & Johnson's information services division replaced a voice-messaging system with a unit from a different vendor, many of its internal customers complained that division members weren't using the system properly, causing a decline in service quality.

When the new system was first implemented, users were given booklets that explained its features. "For a person with a telephony background, it seemed like a no-brainer. We thought users could learn to use the system on their own," said Julia Enerson, a telecommunications consultant for Johnson & Johnson in Raritan, N.J.

The company decided the best option, short of turning off the system, was to retrain employees to use the system properly. This process, known as a restart in the voice-messaging industry, is not uncommon among companies that implement voice-messaging systems, said Vanguard's Dwyer.

As part of its restart program, Johnson & Johnson brought in outside consultants to conduct 90-minute classes for everyone in the division. Users were taught to give detailed personal greetings and were encouraged to leave voice messages for internal staff instead of calling directly. A survey taken after the training sessions indicated that people no longer saw the system as an answering machine but as a communications resource that could improve productivity, Enerson said.

When Colgate-Palmolive Co. implemented a voice system at its corporate headquarters in New York, many employees became more difficult to reach because they used the system as a convenient way to avoid answering the phone. Top management quickly issued a companywide policy stating that users should answer their phones when in the office ("Selling upper management on voice-messaging system," *NW*, Nov. 6).

The company also reprogrammed the voice system with an escape mechanism that enables callers to switch their calls to an operator or a phone station that doesn't have a mailbox. This ensured that callers wouldn't be trapped in something known as voice mail jail, in which callers get bounced from one voice mailbox to another without being able to access a live attendant.

For most companies, the process of training employees to use voice-messaging systems is ongoing. New hires need to be trained on the company's system, and other employees need to be monitored to ensure they don't misuse the system. Santacroce estimated that at any given time, about 15% of the work force at Connecticut Mutual aren't using the system properly.

Connecticut Mutual's voice mail system notifies Santacroce of users who let voice messages build up in their mailboxes. Sometimes, it's simply because workers are on vacation, but at other times, users are hiding behind their systems and causing a communications logjam. Connecticut Mutual employees are required to return all calls within three hours, she said.

If users persistently lapse in using the system as designed, the company takes away their right to maintain a mailbox. "We threaten to take away people's mailboxes quite a bit," Santacroce said. "Sometimes it's the only way to get them to use the system properly."

Quality is the watchword

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detailed list of statistics on network performance. Eight posters hang in the company's network control center displaying performance statistics for availability on the company's backbone network, which comprises more than 270 T-1 lines spanning the country; the percentage of network problems resolved within four hours; the percentage of problems detected at the control center before being reported by a user; and the total number of trouble tickets.

In addition, lengthy reports detailing network performance by vendor and circuit are distributed to all personnel in the net control center. The reports contain detailed breakdowns of how long it takes to resolve problems.

"The vendors can use this information to see how well they are doing relative to [one another]," O'Toole said. "We think it gives them a good incentive to improve performance."

O'Toole said performance in each of the categories the net group tracks has improved markedly since the firm began publishing the information in 1986.

Network uptime has improved from about 99.5% in 1986 to 99.98%, and 75% of network problems are now resolved within four hours, up from approximately 70%. In addition, 55% of network problems are detected in the network control center before users report them, which is up from 40% at the onset of the program.

When Westinghouse first began tracking performance data, US Sprint Communications Co. and MCI Communications Corp. were far slower in fixing network problems than AT&T, O'Toole said. Both carriers were able to fix only about half of the reported problems within four hours. Now, O'Toole said, the three carriers are equal with one another in resolving 75% to 80% of the network problems within four hours.

He added that call setup time from the two carriers has also caught up with AT&T, and now they average around 10 seconds. Initially, O'Toole said, MCI's and US Sprint's call setup times could be as long as 20 seconds.

Because of these improvements, O'Toole said Westinghouse handed MCI about two-thirds of its long-distance business as part of a $75 million to $100 million contract announced in May. Westinghouse splits the other third of its traffic between AT&T, US Sprint and other carriers.

PRODUCTS & SERVICES

THE LATEST OFFERINGS FROM VENDORS AND CARRIERS

Worth Noting

See inside for:

- Sun Microsystems' new net control tool allows users to access files anywhere on the network.
- Multi-Tech unveils its first venture into the Ethernet LAN market.

First Look

New software for EISA-based micros

Emerald Systems Corp. recently introduced software that performs data backup and file management for Compaq Computer Corp.'s recently introduced Extended Industry Standard Architecture (EISA) bus-based SystemPro line of microcomputers and servers.

The Emerald Systems' software consists of three packages: **EmQ,** a disk backup program; **EmSave,** a file backup program; and **EmLib,** a data base utility that tells users where files are stored on backup tapes.

EmQ software is designed for distributed server-based backup environments where critical information is stored on hard disks. It allows local hard disks to be backed up across the network to a centrally located, shared tape drive.

EmSave software is designed for centralized backup of applications on networks with 40M bytes to more than 15G bytes in disk storage.

EmLib, a media librarian or file management utility, searches indexed data bases of network files stored on tape to determine which tape contains a file or group of files. EmLib manages file backup onto multiple off-line storage devices, regardless of the device or recording format.

All three software packages are available now. EmQ prices range from $1,195 for a low-end product to $1,495 for a version with five backup tapes.

EmSave costs from $395 to $695, and EmLib is priced at $395.

Emerald Systems Corp.,
(continued on page 34)

Racal-Milgo rolls out T-1 CSU family

SUNRISE, Fla. — Racal-Milgo recently announced a new family of T-1 channel service units (CSU) and a chassis that can support up to 14 T-1 CSUs.

The Omnimux Intelligent CSU (ICSU) family provides users with local and remote network management from a Digital Equipment Corp. VT-100 terminal attached through an RS-232 management port or through integration with one of Racal-Milgo's other net management offerings.

The new offerings are: the stand-alone Omnimux ICSU-10, which supports a single T-1 line; the Omnimux ICSU-100, which also supports a single T-1 trunk but offers net management functionality; the Omnimux ICSU-200, a chassis that can accommodate two ICSU cards; and the Omnimux ICSU-1400, which holds up to 14 ICSU cards.

The Omnimux ICSUs support multiple T-1 framing formats, including D4, superframe format and extended superframe format (ESF).

ESF is the only available format that provides bandwidth for management statistics, but the ICSUs gather statistics from T-1 spans using any of these framing formats through an RS-232 management port.

CSUs — required to interface T-1 multiplexers to transmission facilities — enable users and telephone companies to isolate faults and problems by performing tests, such as loop-back tests on both the T-1 and digital sides of the network.

The company previously offered CSUs, but those products, known as TC1 CSUs, lacked intelligence and, therefore, network management capabilities. They will no longer be offered.

A key management function built into the Omnimux ICSU line is the ability to report alarms, such as loss of signal or loss of synchronization, to a management console and to then determine which alarms are considered major and minor according to user-selected thresholds.

This gives users the ability to start reacting to problems before an outright failure occurs, explained David Rieback, senior product manager at Racal-Milgo.

This type of proactive approach is particularly important when supporting data transmissions. "The most expensive part
(continued on page 35)

PC call accounting system centralizes PBX support

By Tom Smith
New Products Editor

SCHAUMBURG, Ill. — Infortext Systems, Inc. recently introduced a system that enables users to collect data from local and remote PBXs, and transmit it to a centralized workstation to produce call detail reports.

OS Plus Polling System's key hardware component is a communications processor board that fits into an IBM Personal Computer AT. The Personal Computer is positioned as a centralized call accounting system and is linked to a local private branch exchange through its call detail record port.

The central-site Personal Computer AT receives call records from local and remote sites and uses the data to generate call detail reports.

In addition to the communications board in the Personal Computer AT, Infortext supplies software for the Personal Computer that schedules intermittent polling of remote sites for call records and performs report generation.

The system supports as many as 5,000 stations between remote and central sites. The software supports a variety of PBXs, including those from Siemens AG, AT&T, Northern Telecom, Inc. and Rolm, an IBM and Siemens Co.

Remote polling unit

Remote PBXs are each equipped with a remote polling unit (RPU), a stand-alone box with the OS Plus Polling System's processor board, a hard disk and a modem. The RPU connects to the remote PBX and taps into it via the call detail record port.

The RPU polls the remote PBX for data and translates it into call records with information such as time of day, length of call, calling party, calling party's authorization code and number called.

The coprocessor board can buffer as many as 1,500 call records. When the RPU's buffer is 75% full, it writes the records to a 20M-byte hard disk, where they are stored until the central-site Personal Computer polls the RPU to upload the call detail records. The remote hard disks can store as many as 100,000 call records.

The central-site Personal
(continued on page 34)

Upgrade of low-end LAN eases net upkeep

The new version of 3X-Link16 can be configured from a single workstation, has new printer support.

By Tom Smith
New Products Editor

FORT LEE, N.J. — 3X USA Corp. recently upgraded its proprietary, low-end local-area network by giving workstations access to multiple printers and providing the ability to configure all net workstations from a single device.

The product, 3X-Link16 Starter Kit Version 4, supports as many as 16 IBM Personal Computer ATs, Personal System/2s or compatibles.

The unshielded twisted-pair network uses a daisy-chain topology configured using 12-ft. lengths of cable that are terminated by RJ-45 jacks, two at each end. One of the two jacks at the end of a cable can be used to support a workstation; the other jack can support another 12-ft. cable.

Parallel port

3X's proprietary external LAN interfaces are tied to workstations through their parallel ports, according to Matthew Simonnet, vice-president of 3X USA.

Use of the parallel port allows the microcomputers to transfer files at 500K bit/sec, faster than the 115K bit/sec limit of zero-slot LANs. Zero-slot LANs are software-driven and typically link microcomputers using serial ports.

Workstation users can communicate with one user at a time, but as many as eight pairs of users can communicate over the LAN simultaneously at 500K bit/sec. The LAN adapters divide the cable into eight channels that are chosen at random.

> Use of the parallel port allows the micros to transfer files at 500K bit/sec.
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Users who want to initiate a file transfer can call the target node, and when they are ready to send a file, they receive a split screen. The left screen, representing the user's own node, displays the file, and the right screen represents the recipient's node. The user transfers the file by moving the cursor to the right screen and invoking the send command.

The previous version of 3X-Link16 supported a maximum of 16 printers, but each personal computer could access only one parallel printer at a time. The new release also supports a maximum of 16 printers, but a single personal computer can access up to six printers at a time.

This capability is provided by print spooler software, included

> As many as eight pairs of users can communicate over the LAN simultaneously.
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with 3X-Link16, which supports six parallel or serial devices, whether printers or plotters, on any one computer. In addition, it can spool and print any size file by writing that file to the microcomputer's hard disk.

The product's automatic software installation, also a new feature, lets users initialize and configure every node on the network from a single workstation. For example, this enables customers to create a configuration file, user directory and password file, and to distribute these files to each workstation.

The product's electronic mail capabilities, which are the same as those offered in previous releases, offer users a full-screen message editor, an electronic letterhead that includes name, station, date and time, as well as fields to identify the message recipient, including recipient name and subject of message. Users can attach any type of file and send messages to one or more users.

The product requires MS-DOS 2.0 or higher and 70K bytes of random-access memory on each microcomputer. The printer spooler software, which is optional on each station, requires 60K bytes of RAM.

The starter kit for two nodes, 12 feet of cable and spooler, and E-mail software costs $349; additional nodes cost $139 each.

3X USA can be reached by writing to 1 Executive Drive, Fort Lee, N.J. 07024, or by calling (201) 592-6874.

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PC system offers central support

continued from page 31

Computer AT, through its Central Accounting and Polling Software Plus, automatically polls each remote site at a user-specified interval. The RPU uploads the call record data through an asynchronous Hayes Microcomputer Products, Inc.-compatible 2,400 bit/sec modem.

Users can program the system to upload data to the central-site Personal Computer AT overnight, when telephone rates are lower.

Once calling data is written to the central-site Personal Computer AT's hard disk, another software component — OS Plus Call Accounting System — is used to prepare standard or customized reports.

Standard reports cover extension detail, organization detail, authorization code detail and trunk detail, as well as summary reports in all of these categories, according to Greg Hull, national sales support manager for Infortext Systems.

Users may customize such standard reports by selecting calls by a specific authorization code to a specific area code, for example.

When preparing a call accounting report, users can select a particular site, a group of sites or all sites, and the system will consolidate data for the site specified. Five levels of cost allocation are available: site, division, department, cost center and user.

Users can allocate all calls made by the marketing department and assign their cost to the marketing department at the central site, or they can allocate call costs by specific site.

OS Plus Polling System is available now.

A system for two sites, with central-site hardware and software and two RPUs, costs $10,000; a system for 30 sites costs $120,000; a system for 99 sites costs less than $300,000.

Infortext Systems can be reached by writing to 1301 Basswood Road, Schaumburg, Ill. 60173, or by calling (708) 882-7173.

Multi-Tech Ethernet LAN wares bow

MOUNDS VIEW, Minn. — Multi-Tech Systems, Inc. recently introduced a 16-bit Ethernet local-area network interface for IBM Personal Computers, Personal System/2s and compatibles, as well as an 11-port Ethernet hub.

The Ethernet LAN products, the EN-Series, support thick or thin coaxial cable and unshielded twisted-pair wiring. The products represent Multi-Tech's first venture into the Ethernet market.

Previously, the company's LAN offerings consisted exclusively of Arcnet hubs and interfaces; Multi-Tech also markets modems and multiplexers.

The EN-Series includes the EN301AUI/PC network interface that supports thick coaxial cable, the EN301CX/PC that supports thin-wire coaxial cabling and the EN301TP/PC that supports unshielded twisted-pair wiring. All models are available for personal computers that support the Industry Standard Architecture (ISA) bus or the Micro Channel Architecture bus.

The interfaces come equipped with a software driver that enables them to operate on Ethernets running any version of Novell, Inc.'s NetWare. They are also sold in hardware-only versions, which can be equipped with drivers to support any of the major LAN operating systems.

Multi-Tech's EN512TP/AUI Ethernet hub offers users 11 RJ-45 twisted-pair connectors and one Auxiliary Unit Interface (AUI) connector. The RJ-45 connectors can attach to network interface cards up to 328 feet away, while the AUI connector attaches to thick or thin Ethernet cabling with a limitation of 1,365 feet.

The network interface cards and the Ethernet hub are available now.

Ethernet interfaces that support ISA for personal computers cost $349, while interfaces for Micro Channel Architecture machines cost $489. The Ethernet hub costs $1,995.

Multi-Tech can be reached in writing at 2205 Woodale Drive, Mounds View, Minn. 55112, or by calling (612) 785-3500.

First Look

continued from page 31

4757 Morena Blvd., San Diego, Calif. 92117; (619) 270-1994.

Sun unveils software tool to allow wider file access

Sun Microsystems, Inc. recently introduced a low-cost network management tool that enables application developers to add record management capabilities to Unix applications.

Dubbed **Net Indexed Sequential Access Method (NetISAM),** the product is an X/Open-compliant software tool based on the latest X/Open XPG-3 specification. Applications designed using NetISAM will enable users to store and access files located anywhere on the network.

By contrast, most other currently available ISAM software tools only allow users to access data that is stored on their local file servers.

The addition of a networkwide record management capability will enable users to add, delete, change and retrieve data from files, regardless of whether they are located on the same local-area net or a remote LAN.

This is accomplished through use of a "key value," which is a unique part of a file, such as a particular user's social security number.

NetISAM is available now. The software, documentation and single-user license costs $1,000; each additional user license costs $500.

Sun Microsystems, Inc., 2550 Garcia Ave., Mountain View, Calif. 94043; (415) 960-1300.

Racal-Milgo rolls out CSU family

continued from page 31

of the network is probably the data going through the T-1," Rieback said. "If you can react before the T-1 is down and prevent data loss, you're saving your company considerable amounts of money."

As part of this alarm reporting, ICSUs can automatically dial out to a management console when prompted by alarms that require real-time notification.

Other management capabilities include reporting 11 key statistics pertinent to T-1 trunks on a continuous, real-time basis. These statistics include cyclic redundancy check errors and total errored seconds, as well as seconds in which at least one ESF error occurs.

All statistics are reported in 15-second intervals over a 24-hour period. As new statistics are generated, the oldest 15 seconds worth of statistics are discarded, Rieback explained.

The statistics will enable customers to monitor the performance of T-1 links for adherence to contract stipulations. Users can study such performance indicators as uptime levels and error rates.

With the Omnimux ICSU-200 and Omnimux ICSU-1400, the CSUs can be configured for 1-to-1 redundancy, Rieback explained. A user would configure them for backup purposes from the VT-100 console.

Customers with existing Racal-Milgo net management systems can control the new CSUs.

The ICSUs can be managed from the VT-220 terminal used to support the company's Omnimux 7000 channel banks; its Communications Management Series 8800 mid-range T-1 net management system, which is based on a DOS-based IBM Personal System/2; and its Omnimux 9000 T-1 net management system, which is based on a Sun Microsystems, Inc. workstation.

The Omnimux ICSU-10 entry-level version lacks the network management functionality of the other members of the Omnimux ICSU line, but it can be managed from the terminal of any of the other Omnimux ICSU products. The Omnimux ICSU-10 gathers statistics, but that data must be accessed over the ESF management channel because the ICSU-10 does not have an RS-232 management port.

All of the Omnimux ICSUs are available now.

The Omnimux ICSU-10 costs $3,488; the Omnimux ICSU-100 costs $3,994; the Omnimux ICSU-200 chassis costs $3,645; and the Omnimux ICSU-1400 chassis costs $5,265. ICSU cards for the ICSU-200 and ICSU-1400 cost $2,744 each.

Racal-Milgo can be reached in writing at 1601 N. Harrison Pkwy., Sunrise, Fla. 33323, or call (305) 475-1601.

OPINIONS

EDUCATION

BY MATT COOLEY

Why can't Johnny telecommunicate?

Kids who show athletic promise are sure to get the attention they need to develop their ability. But how many kids who are interested in communications get a chance to use, or even see, a computer?

When I talk about kids using computers, I don't mean nerds or hackers sitting in the closet programming, practicing drills or playing games; I'm talking about kids using the power of electronics and networks for communications.

Hardware costs have dropped and computer capabilities have risen in the past few years — much further, it seems, than our ability or interest to use them. Isn't it time we try to catch up? Isn't it time to get our local schools involved?

> The low-cost computer has the potential to revolutionize education.
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The greatest tragedy of our time may be our failure to integrate computers into our educational system in primary and secondary schools. It may be our last chance to stay ahead of the Russians and Japanese. Indeed, our survival may depend on our ability and willingness to telecommunicate.

Our schools now have the potential to create an environment in which students can use software, networks, interactive video and telecommunications to enhance learning. But how many schools are doing it?

My computer bulletin board system (BBS), the Ultimate BBS, is located in a rural area in the foothills of the Blue Ridge Mountains, yet I converse with hundreds of friends from all over the country. More than two dozen elementary and secondary students call the Ultimate BBS every day. Most have never met each other in person, but by using the BBS, they form teams, plan and discuss strategies, run factories and compete in interactive adventure simulations and war games.

A BBS is part post office, magazine, library, arcade, flea market and, of course, message center. My callers leave private and public messages to one another on all topics imaginable — such as abortion, gun control and movies — and help each other with problems or just chitchat. A BBS may be the last institution to offer free programs and advice, and encourage the free sharing of knowledge and ideas without trying to sell anything.

I consider my BBS, the contacts I make, the programs I use, the information I gather and the meetings I attend to be the equivalent of a year of college — well worth the few hundred dollars it costs to operate each year.

Because of my BBS, I am the first to get and try out new software; yet only a handful of teenage system operators exist across the country. Why? You have to get them involved before they become interested in dating and cars.

The low-cost computer has the potential to revolutionize education. We are seeing the emergence of a true global classroom — linking students with people and information sources from all parts of the world. Telecommunications is truly the pathway to the future. Shouldn't we make sure our kids get the opportunity to develop the technical skills they will need to function and excel in the society of the '90s?

Isn't a future computer telecommunications expert as important to our country as a future quarterback?

Cooley, a 10th grade student at Blue Ridge High School in Greer, S.C., is system operator of The Ultimate BBS, a computer bulletin board system in Tigerville, S.C. He has been awarded a grant by the Alliance for Quality Education to get more students and teachers involved in telecommunications.

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EDITORIAL

In superserver era, software becomes LAN bottleneck

With the advent of so-called superservers for local-area networks, the pressure is on software developers to build applications that take advantage of the power of these new computing platforms.

Advances in hardware technology have outstripped the ability of developers to produce applications for new types of systems or to modify existing applications for these new environments.

During the past few months, vendors have unveiled new servers that promise to dramatically increase the functionality of LANs and speed the advance of client/server computing.

Consider the following:

- In September, NetFrame Systems, Inc. introduced a line of LAN servers that it dubbed "the first network mainframes." These run standard LAN operating software but are based on multiple processors and have a mainframe-type I/O architecture.
- Shortly afterward, Auspex Systems, Inc. unveiled a Unix-based superserver that also takes advantage of multiple processors and a speedy bus architecture.
- Compaq Computer Corp. announced in November the first computers that it designed specifically for server and multiuser environments. The company's Extended Industry Standard Architecture-based SystemPro superservers support multiple processors, mainframe-class mass storage and massive amounts of system memory.
- In response to Compaq's move, IBM at Comdex/Fall '89 unveiled an ad hoc superserver of its own — a Micro Channel Architecture-based Personal System/2 Model 80 configured with two microprocessors and 14 hard disk drives supporting 320M bytes of memory. The system dramatically outperformed a standard Model 80 server in IBM's demonstration.

Unfortunately, the capabilities of these systems will be largely untapped in the near future. The problem is the lack of application software designed to exploit this new hardware. In fact, there is relatively little application software designed specifically for the LAN environment. Much of what is available is simply retooled versions of single-user packages.

> There is little LAN application software.
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Ironically, while high technology has transformed many fields, software development remains largely a time-consuming, manual process devoid of automation. Because it takes so long to design and build applications, there is a lengthy application backlog — as long as three to five years in most companies.

That means it may be quite some time before applications are developed for the new superserver platforms or before applications are migrated downward from larger systems.

One promising sign is the emergence of data base server software that will support future LAN-based, client/server applications. Companies including IBM, Oracle Corp., Ingres Corp., Sybase, Inc. and GUPTA Technologies, Inc. are offering or planning to deliver data base server products.

But there are few applications designed to work hand-in-hand with these products in a client/server environment.

The onus is on software developers — from IBM to the smallest programming shop — to focus their attention on delivering a new generation of applications for the changing LAN world. Vendors must also provide the software development tools users need to build these complex new applications.

Also, users must rethink their own development efforts. As part of the design process, developers should carefully consider whether applications intended for the host environment wouldn't be more effectively deployed on a LAN platform.

In the absence of well-designed network-oriented applications, LAN users will find that software — not hardware — is the bottleneck.

OPINIONS

THE FUTURE OF TELECOMMUNICATIONS

BY RICHARD REEDER

Users must light a fire under telecom industry leaders

Because of the current transitional turmoil in the telecommunications industry, the U.S. is in danger of missing out on the ultimate payoff: a world-class pipeline into the information age. The problem is that our telecommunications industry is marked by fragmentation and lack of visionary leadership.

We are about to enter the 21st century. But we are burdened by an old base of technology, corporate fiefdoms, regulation, finance and fundamental assumptions, some of which date to the early 20th century.

The potential of the information age, which can transform society for the better, is vast. But instead of visionary leadership, we have a bunch of shortsighted managers focusing their company efforts on profitability and market maneuvers.

While the Communications Act of 1934 was a grand achievement, it's now more than 50 years old and is a weak guide for the future. And while U.S. District Court Judge Harold Greene has done an outstanding job of presiding over the Bell System breakup, his work is based entirely upon antitrust law. This is akin to regulating stock car racers based on exhaust emissions.

Every innovative venture in the industry is subject to veto in the courts or before the regulators. If a proposal is not vetoed directly, lengthy litigation supported by parochial groups that believe their interests may be hurt becomes an indirect veto. Lawmakers, seeing a lack of consensus and worrying about powerful special interests, often become frozen into inactivity.

The state of regulation is ridiculous. With state public utility commissions (PUC), the Federal Communications Commission, the National Telecommunications and Information Administration, Congress and others, we have more than 50 groups overseeing the industry.

Reeder is an independent consultant based in Lafayette, Calif.

The focus on state and local access and transport area boundaries makes little sense. How many regulators and monopolies have their finger in the BOWASH pie — the Boston/Washington, D.C. corridor, which contains one-sixth of our population as well as a large proportion of our economical and leadership assets.

The closest thing we have to a leadership organization is probably Bell Communications Research. This bureaucratic assemblage of geniuses, however, is a captive of the regional Bell holding companies. Its recent efforts at leadership haven't been well supported by vendors.

Who is looking out for the interest of the user? And what about the national interest?

The highway and airway systems weren't cobbled together from the uncoordinated efforts of self-serving companies. Leaders developed a vision of the requirements for and benefits of a coordinated system.

Even teenagers know the protocols for using the highways and airways and are able to arrive at their destinations with minimal trouble. The equivalent, a "telecommunications highway," while technically more complex, should be our goal.

Or take the perspective of a large multinational company. Trying to meet its telecommunications needs in the U.S. means dealing with a balkanized, crazy-quilt landscape of competing and overlapping fiefdoms. Coups, putschs and purges threaten from various interests and overseers such as the PUCs, FCC, U.S. District Courts and financial arbitrageurs.

This creates a livelihood for telecommunications managers but also puts them in a no-win situation. Networks are never optimal either for service or cost. Obsolescence and downtime are constant threats, while vendors try to demonstrate that they are not contributing to the problem.

Control over and visibility of networks and costs is minimal. And costs to various users may be markedly different. New services and equipment are made to operate, if at all, only with major efforts; standards, if any, are in pathetic shape.

Users in Canada, France and Japan can look up information in the Yellow Pages or White Pages, plug into packet networks, send electronic mail and access data bases using their public telephone networks. Why can't we?

Prior to the Modified Final Judgment, the Bell System provided telecommunications leadership. However, their position tended toward "What we provide is what you need." What we need is a new vision.

Let's set some goals for the vision of telecommunications in the information age. This vision must cover the next 10 to 20 years. End users must be able to plug into high-capacity highways. We must be able to send and receive video, text, data, images and voice. We must be able to do this through time, as well as over distance, with messaging and store-and-forward.

Group interaction and work sharing must be facilitated by the telecommunications system. Computer data interchange must be routinely easy, regardless of the source or destination. Users must be able to control who can address them, as well as ascertain and control costs and available services.

New services and technology must be easily introduced by anyone, using known standards and protocols, without legal and regulatory hassles. Customer premises equipment should plug in and work. Users should not be concerned with network design or optimization; the highway must take care of it.

Libraries and journals of all kinds must be available on-line to users at the touch of a button. Special events and shows must be accessible to users — either in real time or delayed. Education comprising all levels of ex-

(continued on page 50)

THE HOLIDAY SHOPPING CRUNCH GOT YOU DOWN? Pick yourself up by writing an opinion column for *Network World.*

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TELETOONS

BY FRANK AND TROISE

LETTERS

Telecommuting talk

In "Telecommuting on the ISDN highway" (*NW,* Sept. 25), Bill Buffam contends that professionals and managers aren't involved in telecommuting because of an inadequate technical infrastructure; that doesn't square with reality.

My work since 1982 in setting up and reporting on telecommuting programs strongly indicates that many professionals in various disciplines are telecommuting effectively. Very few managers are, but that is because their jobs aren't well-suited to telecommuting; managers have fragmented tasks that are difficult to schedule, and they need to provide supervision.

ISDN certainly is a threshold technology that will help telecommuting and open up broader applications. But, there's no need to wait for telecommuting to roll out nationwide before companies can take advantage of it. Let's not ignore today's technology as we wait for tomorrow.

Gil Gordon
Editor
Telecommuting Review
Monmouth Junction, N.J.

Tell your congressman

The technical press coverage of Hurricane Hugo's effects on communications only underscores the valuable service that amateur radio and volunteer ham radio operators continue to offer in times of emergency.

As indicated in your article titled "Hurricane Hugo wreaks havoc on carrier nets" (*NW,* Sept. 25), almost all commercial communications were disrupted in the Caribbean, and some will take months to restore.

Nevertheless, Congress is now prepared to levy license fees for amateur radio operators as part of HR 3299.

Please help defeat this initiative.

Andrew Farber
Amateur Call N400X
Tarrytown, N.Y.

Network World *welcomes letters from its readers.*

Letters should be typed, double-spaced and sent to Editor, Network World, *375 Cochituate Road, Box 9171, Framingham, Mass. 01701.*

Letters may be edited for space and clarity.

Long-distance learning

By MICHAEL FAHEY

When it comes to graduate education, engineers and computer scientists are confronted with a paradox. On one hand, because technology is constantly changing, they are continually faced with potential equipment — and career — obsolescence. But on the other hand, because they practice applied disciplines, these technical and scientific professionals have little time to spend in the groves of academe pursuing advanced degrees.

The solution to this educational conundrum? If the students can't come to class, bring the class to the students via satellite television.

The National Technological University's televised curriculum enables busy engineers to earn master's degrees without ever entering the classroom.

NTU is on the air

"Very few engineers go to graduate school," explains Doug Yeagar, vice-president of marketing for the National Technological University (NTU). "There is a consensus that the technical knowledge of our engineers diminishes very quickly. They become obsolete after four or five years if they do not avail themselves of educational programs."

Since 1985, NTU has been working to meet the advanced educational needs of engineers and scientists by offering instructional TV courses taught by the faculty from 29 of the nation's engineering universities. Last year, NTU beamed more than 7,000 hours of academic credit instruction and more than 1,000 hours of noncredit technology and management programs to engineers, scientists and technical managers. Courses were broadcast to students at universities, in their places of business and at other sites.

NTU uses two Ku-band transponders on GTE Spacenet Corp.'s G-Star 1 satellite to transmit four TV channels into members' classrooms. Twenty-eight universities currently have uplink facilities capable of transmitting their courses to the satellite for nationwide distribution. Interaction between students and instructors takes place by telephone, electronic mail and teleconferencing. Instructors even offer telephone office hours for students.

Baldwin's brainchild

NTU, which has received the support of some of the nation's top industrial executives, is largely the brainchild of its president, Lionel Baldwin, former dean of engineering at Colorado State University in Fort Collins, Colo.

Baldwin had long been concerned

(continued on page 40)

Fahey is a free-lance writer based in Arlington, Mass.

Telecommunications in the classroom

By Salvatore Salamone
Features Writer

A researcher collects data and transmits the information to a centralized collection station. In a few hours, a composite map of data collected from various regions of the country is transmitted back to the researcher, who then consults with a cross-country colleague via electronic mail over Telenet Communications Corp.'s Telenet network to determine the information's significance.

This scenario would not seem unusual if the researcher were a scientist working for a large research organization. In this case, however, the researchers are elementary school children using telecommunications in the classroom.

Called the National Geographic Kids Network, this telecommunications-based science curriculum is for children in Grades 4 through 6. Through this network, students participate in large-scale, cooperative experiments and share their results with other students around the world.

The Kids Network is part of a National Science Foundation (NSF) effort to improve U.S. elementary school science education. Of the seven major awards given for this purpose, the Kids Network project is the only one to use telecommunications.

The project is funded by the NSF and the National Geographic Society, each of which is providing $2.5 million over the next four years. In addition, Apple Computer, Inc. donated 175 Apple IIGS computers to the Kids Network.

The project coordinator, the Technological Educational Research Center (TERC) of Cambridge, Mass., says it expects the network to connect as many as 10,000 schools by the end of the four years. TERC also expects that the expanded demand will encourage further funding by the NSF and other sources.

Since the program began in 1986, TERC has developed five study units covering subjects such as acid rain, meteorology and lead in drinking water. The units include teacher's guides, background material and experiments for the students to perform.

Typical communications over the Kids Network includes exchanging messages and transferring data via dial-up Telemail service over Telenet. Data varies by unit; data for the meteorological unit includes such things as temperature, wind speeds and rainfall observations. TERC developed user-friendly, graphics-oriented communications software to ease data transfer by students and teachers.

A host computer at TERC polls this data and creates a composite map. This map is put in an electronic mailbox for schools to retrieve using the modem and communications software. In the future, the data transfer may be accomplished using dial-up links to a centralized computer at TERC.

Each Kids Network unit is led by an adult scientist who comments on the results and corresponds with the students over the network using Telemail. The unit scientist acts as a guide and a role model for potential future scientists. John Miller is the unit scientist for the acid rain project; he is also deputy director of the Air Resources Laboratory at the National Oceanic and Atmospheric Administration and serves as the U.S. representative at many international scientific meetings on acid rain.

Miller sees the Kids Network as providing a degree of interaction and information beyond the scope of the usual science project.

He also says he believes the project gives students a taste of what scientific research is all about. "Science today is a multidisciplinary problem that brings together a group of scientists from diverse fields to try and understand it," he says.

For example, in the early days of acid rain research, technologists and meteorologists approached the problem from two very different perspectives. "None of them really understood it in terms of the big picture. It took many years for the people who are looking at the effects of acid rain to talk to the people who are trying to understand its transport," Miller explains.

The National Geographic Kids Network gives young students around the globe the power to share scientific results.

Today, approximately 800 U.S. schools are linked by the Kids Network. In addition, schools in Hong Kong and Moscow also participate, according to Cecilia Lenk, associate director of the science center at TERC. These international nodes on the Kids Network connect to Telemail via dial-up gateways.

While the Kids Network seeks to encourage future scientists at the elementary school level, another project uses telecommunications to push middle and high school students into becoming researchers.

Like Kids Net, the Star Schools Program uses dial-up E-mail for message and data transfer. The network is funded with a $4.5 million grant from the U.S. Department of Education. Although the program is open to all students, it is especially targeted to low-income, educationally disadvantaged, female and minority students.

In addition, by bringing research scientists and other experts into the classroom, the network allows schools to access resources that they would not normally be able to use, thus giving smaller schools advantages similar to larger institutions. Today, more than 18,000 students and 600 schools participate in the project. Lenk predicts that the number of schools will double by the spring of 1990.

Expansion

The program recently expanded to include international sites. A grant to TERC from the John D. and Catherine T. MacArthur Foundation provides funding for several Soviet schools to join the network. In addition, several Japanese sites now in the network are supported by the Japanese publishing company Fukutake, Inc.

The Star Schools program throws out the traditional textbook approach to teaching science and math and allows for more creativity. For example, some of the projects that students are conducting include measuring radon levels in schools, designing solar houses, collecting weather data and exploring the chaos theory.

The Star Schools Program is a collaborative effort of TERC and 12 educational institutions, including the universities of Georgia, Virginia and Michigan, the Boston Museum of Science, Arizona State University and Tufts University. These institutions serve as resource centers that offer teachers extensive training and support through the telecommunications network. Through this participation, teachers can incorporate technology and innovative science and math research projects into their classrooms.

"We want kids to be scientists and mathematicians, to experience for themselves the excitement of discovery and to work collaboratively with other kids, teachers and scientists around the globe," Lenk says.

(continued from page 39)

about the problem of providing engineers with continuing education and advanced degree programs. As a result, he became an early advocate of instructional television, also called "distance learning."

Baldwin and his colleagues in the Colorado State University engineering department began using TV for instruction in 1967. "That was when the first portable [video]cassette tape recorders came out," Baldwin explains.

In the past, the biggest problem that proponents of instructional television faced was not technical; it was overcoming popular skepticism about TV as an educational medium, according to Baldwin.

"I found that even in the early '80s, people were still skeptical, although we had almost 20 years of experience" in providing instructional television, he says.

Baldwin admits that anyone who remembered the early days of instructional television could not be faulted for viewing the medium with a jaundiced eye. From the 1950s until the early 1970s, he says, instructional television was dominated by production and theatrical types rather than by educators. It was thought that instructional television required actors performing on elaborate sets, rather than real teachers in a classroom or other learning environment.

Baldwin, who served on a federal government team evaluating instructional TV programming, recalls one segment produced by a large Midwestern university that was a pioneer in the medium. It concerned personal finances and was set in a farmhouse.

(continued on page 42)

Baldwin and his colleagues began using TV for instruction in 1967.

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The biggest problem instructional TV faced was overcoming popular skepticism.

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"The farmer was talking to his wife, and as luck would have it, who should show up but the local banker," Baldwin recalls with a chuckle. The set depicted a "traditional Midwestern farmhouse" so, of course, there was a handy chalkboard mounted on one of the kitchen walls for the banker to use during his supposedly impromptu lecture. "The situations were incredibly contrived," Baldwin says. "There was not an educator in sight."

Instructional television survived its early days in the hands of the Hollywood types, and since the mid-1980s, there has been a growing acceptance of the medium.

According to Baldwin, this is due in part to the development of low-cost, widely available VCRs and many other technical improvements in broadcasting and receiving satellite television.

NTU has a board of trustees that includes executives from AT&T, DEC, Eastman Kodak and GE.

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However, even as potential students and faculty were warming to the idea of instructional television, NTU personnel were faced with the often frustrating task of securing cooperation from the nation's colleges and universities and from the corporations and government organizations that employ the technical professionals for whom NTU is designed.

Through persistence and diplomacy, that hurdle was eventually overcome, and NTU now has a board of trustees that includes executives from companies such as AT&T, Digital Equipment Corp., Eastman Kodak Co. and General Electric Co. Formerly housed in facilities rented from Colorado State, NTU broke ground on its own building in Fort Collins earlier this year.

Through cooperative arrangements with its participating universities, NTU has access to more than 3,500 engineering and computer science faculty members. In the four years since its inception, NTU has conferred 59 master's degrees.

Currently, there are 700 matriculating students who will earn master's degrees within the next five years. The noncredit courses and seminars reached an audience of more than 45,000 people during the 1988-89 school year.

NTU initially offered master's degrees in computer engineering, computer science, electrical engineering, engineering management and manufacturing systems engineering. Earlier this year, the school added master's degree programs in materials science and management of technology. The management of technology program is designed for technical managers who are interested in strategic business issues and in integrating technology into their organization's overall business objectives.

The noncredit courses and seminars reached an audience of more than 45,000 people during the 1988-89 school year.

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NTU offers several courses on networking through its "Professional Development Series." The courses cover such topics as Integrated Services Digital Networks, selecting a local-area network, Transmission Control Protocol/Internet Protocol and intelligent networks, as well as introductions to LANs, computer communications and data networking.

In 1974, a group of 12 universities with engineering departments that offered instructional television programs formed a consortium called the Association for Media Based Continuing Education for Engineers (AMBCEE) and began seeking grants to encourage further development of instructional TV. The consortium has grown over the years; many of its members are now NTU participants.

In addition, several universities that participate in NTU, such as Arizona State University, Boston University, Colorado State University, Georgia Institute of Technology and Purdue University, also offer their own satellite programs, generally on a regional basis, and grant their own degrees.

Corporate support

Corporate and government agency support for NTU is essential, Baldwin says. "They pay the freight, and their cooperation is essential to running a distributed educational program such as ours," he notes. "We rely on the corporations and the government agencies to provide the downlinks and the receiving classrooms, and to monitor the exams. They really facilitate the whole process."

In addition to providing downlinks to receive satellite broadcasts and supplying classroom space with TVs and video equip-

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Musical chairs at the FCC

With a final nominee now in the game, the Bush FCC is nearly complete. Here's the lowdown on the new chairman, commissioners and staffers.

CONTINUED FROM PAGE 1
the people of America — to get a video dial tone and to then get a menu of information and entertainment services for everyone."

Pearce is president of Information Age Economics, a telecommunications research firm in Washington, D.C.

Unlike many of his predecessors, Sikes shows a keen interest in globalization of the telecommunications/information network. He has already established an Office of International Communications and says that the FCC "has got to understand the global implications of its decisions."

Under Sikes' direction, the Bush FCC will view public policy from the perspective of user benefits. The major questions that will be asked include:

- How will consumers benefit from this policy?
- What new services will evolve, how quickly and at what price?
- Are the rules fair to all parties?
- Are foreign firms being favored while domestic firms are being handicapped?

The Bush FCC will be among the most experienced ever, from a regulatory and public policy perspective. All four Bush-appointed commissioners are experts in politics, public policy and regulation, and three of them have a significant amount of first-hand knowledge of the telecommunications/information industry. This is almost unheard of in the history of the FCC.

Bush will have an opportunity to name a fifth commissioner after Democrat James Quello's term expires on June 30, 1990. Quello, a former Michigan broadcaster who was named to the commission by President Nixon in 1972, will be 75 years old next April and has said he will not seek another term.

The Sikes team: a snapshot

Sikes, 49, is no stranger to government service. In Missouri, he was assistant attorney general, serving under then state attorney general and now U.S. Sen. John Danforth (R.-Mo.) — Sikes' major political sponsor in Washington, D.C. Sikes also served as the director of consumer affairs, regulation and licensing in the cabinet of former Missouri Gov. Kitt Bond, who, like Danforth, is now a Republican senator from Missouri.

Following his state government service, Sikes, a lawyer, headed his own broadcast man-

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agement and consulting firm, Sikes and Associates, Inc., in Springfield, Mo. He was also an owner or a partner with members of his family in five Missouri radio stations.

In the spring of 1986, Danforth, supported by Bond, persuaded the Reagan administration to appoint Sikes as head of the National Telecommunications and Information Administration (NTIA) in the Department of Commerce.

He stayed with NTIA until Bush appointed him FCC chairman in August.

As head of the NTIA — referred to by some Capitol Hill wags as the Not Terribly Important Administration — Sikes launched studies of the communications industry, meeting with major users and vendors and getting to know the politicians.

Sikes' open style has earned him good relations with almost every heavy hitter in the policy-making process.

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Sikes' open style has earned him good relations with almost every heavy hitter in the policy-making process.

While at the NTIA, Sikes supported the "Telecom 2000" report, which among other things suggested that the White House — presumably via NTIA — should make telecommunications/information policy instead of the FCC. This is somewhat ironic, given that Sikes lobbied vigorously for the job he now has and has said he is looking forward to at least four years at the FCC.

Because of his 3½-year involvement in the public policy-making process, Sikes' public policy views are well-known:

■ He favors lifting two of the three line-of-business restrictions imposed on the regional Bell holding companies and embodied in the Modified Final Judgment that ended the AT&T antitrust suit.

Consequently, he is a supporter of legislation currently before Congress that would permit the RBHCs to enter the equipment manufacturing and information services businesses, subject to FCC regulation.

■ He favors price caps for both AT&T and the local exchange companies. This policy is hotly disputed by industry participants and politicians. Although AT&T received price cap regulation beginning in July 1989, the plan is subject to a three-year test. Price cap regulation for the local exchange carriers is currently on hold.

Although Sikes says establishing price caps for the local exchange carriers is a top priority of his administration, that policy is strenuously opposed by AT&T, the Department of Justice and leading members of Congress, among others.

■ Sikes plans to attempt to further deregulate AT&T. He has said repeatedly that he believes AT&T is now subject to full competition and should be regulated in the same manner as its major competitors, MCI Communications Corp. and US Sprint Communications Co.

■ He says he believes that local telephone companies should be allowed to offer a so-called video dial tone to programmers seeking to use the lines for video entertainment and information programs and services. But he does *not* believe that telephone companies should offer cable television services, at least not until cable TV companies are allowed to offer local voice and data services in competition with the telephone companies. This is a state policy issue and is beyond the influence of the FCC.

■ He is concerned that foreign-owned companies may have distinct competitive advantages, internationally and domestically, over U.S.-owned companies. He may look at FCC rules and policies that actually give foreign-owned companies a competitive edge.

■ He is determined to take a giant step forward in bringing the promised information age to the American public. To accomplish this, he will look at every policy in

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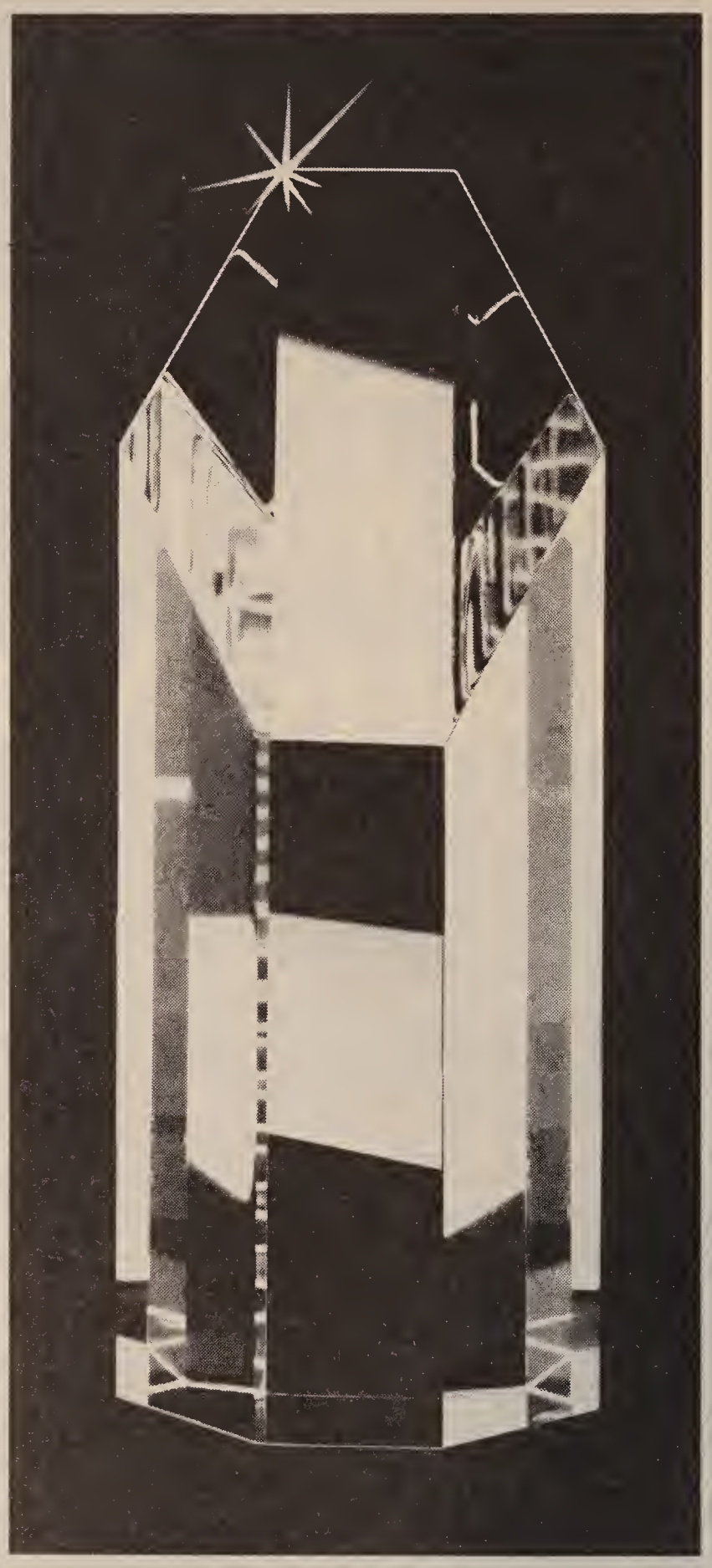

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terms of how it will benefit the consumer, as opposed to how it will help entrenched industry positions.

Andrew Barrett

Barrett, 47, is the first state regulator to serve on the FCC, which has traditionally had policy-making problems with state regulators. For nine years, Barrett served on the Illinois Commerce Commission, which regulates telephone companies as well as the gas, electric and water utilities in the state.

As a state regulator, Barrett advocated greater business freedom for local telephone companies while retaining state regulatory power. Unlike Sikes, Barrett says local telephone companies should be allowed to enter the cable TV and video distribution business.

In letting telephone companies enter cable TV, however, Barrett advocates fairly rigid regulatory constraints. Nonetheless, his views have raised the ire of the politically powerful National Cable Television Association, which is dead set against telephone company entry into the cable TV arena.

Barrett is the first regulator to serve on the FCC, which has traditionally had problems with state regulators.

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Sherrie Marshall

At 36, Marshall is the youngest member of the FCC. She is also the most politically experienced and is so highly regarded by the Bush administration that she is expected to be "promoted" out of the FCC during the next four years.

Immediately prior to returning to the FCC, where she once worked briefly as former Chairman Dennis Patrick's congressional liaison, Marshall was a partner in the telecommunications law firm of Wiley, Rein & Fielding. Richard Wiley, the head of the firm, was chairman of the FCC from 1974 to 1977.

Earlier in her career, Marshall worked as a staff attorney, general counsel and aide to then Chairman Max Fridersdorf of the Federal Election Commission. She has also worked for the Senate Rules Commission and served as an associate counsel and lobbyist for the White House. Marshall worked for the Bush transition team, knows Bush personally and is considered a likely future head of the FCC.

Ervin Duggan

In late November, Bush nominated his fourth FCC commissioner: Ervin Duggan, 50.

Like the other Bush appointees, Duggan, a Democrat, has plenty of political experience, having worked in the Johnson administration as a speech writer and communications expert from 1965 to 1969. Duggan was a White House colleague of Jack Valenti, who is now president of the Motion Picture Association of America.

According to Valenti, "Ervin is a very able fellow, a quick study and experienced in the political arena. Most importantly, he is open-minded."

Duggan worked on the Department of State's policy plan-
(continued on page 49)

Marshall is so highly regarded by the Bush administration that she is expected to be "promoted" out of the FCC.

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Acts of God are just one reason we're so religious about service.

October 17, 1989. The Northern California earthquake hits the San Francisco Bay Area.

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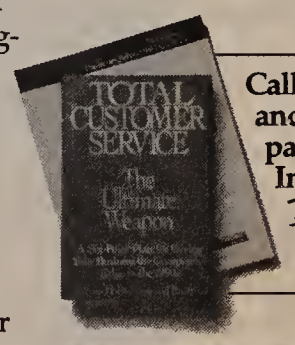

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Long-distance learning

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ment, participating employers must supply a coordinator to act as an on-site support person and liaison among the employer, students and NTU.

One of the important functions performed by the coordinator is taping the broadcasts. This is necessary because the engineers and scientists who are NTU students are usually busy with work and travel, and they more often than not watch taped versions of the live broadcasts.

Some employers allow employees to view the taped classes during work hours; other NTU students must watch the tapes on their own time. All of the classes aired between 6 a.m. and 10 p.m. eastern time are broadcast live. NTU operates 24 hours a day, and the classes that are broadcast before 6 a.m. or after 10 p.m. are generally tapes of earlier live broadcasts.

In this way, the NTU format allows its students to overcome two obstacles: distance and time. By providing courses from 29 universities across the nation, NTU is able to offer a wide variety. And because the live broadcasts can be taped, busy engineers and scientists can fit the course offerings into their work and travel schedules.

Flexibility a plus

It is this flexibility, of course, that is NTU's prime selling point to employers and students.

> The NTU format allows its students to overcome two obstacles: distance and time.
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Lynn Formanek, a software programmer at Hewlett-Packard Co.'s Greeley, Colo., facility, says that if it were not for NTU, earning his master's degree in computer engineering would have meant "taking at least a year off, relocating and losing my place at work." These alternatives did not appeal to Formanek, yet he was determined to continue his education.

For Arlene Havlark, a Seattle-area mother of an 11-year-old, returning to school full time was out of the question.

Havlark, who works for Boeing Aerospace and Electronics, a division of the Boeing Co., needed to find a part-time graduate program to earn a master's degree in computer science.

Unfortunately, the University of Washington in Seattle, which was the nearest university providing the course Havlark wanted, did not offer courses in the late afternoon or evening.

"The program gave me the chance to earn a degree that I would not have been able to earn otherwise," according to Havlark.

"I took 11 courses," she says. "Three of them I watched live nearly all of the time; the others I usually watched on tape." This schedule met her daily work needs and also allowed her to travel for work. "I could take a week-long trip and come back and make up the classes," she explains.

> Formanek says that if it were not for NTU, earning his master's would have meant "taking at least a year off."
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In addition, NTU students say that watching taped classes allows them to go back to portions of lectures that are particularly complicated.

Class participation

All of the NTU courses are part of the participating universities' regular curricula. A dedicated telephone link between the receiving sites and the classrooms from which lectures are broadcast allows NTU students to ask questions and take part in classroom discussions.

However, NTU students often do not use the telephone link to the classrooms, mostly because many of them are watching taped versions of the classes. In addition, according to Sandy Hill, a professor of computer graphics at the University of Massachusetts (UMass) in Amherst, the remote students appear inhibited by the idea of participating in class by telephone. NTU students do, however, talk with professors on the telephone outside of class time.

According to some students, the only major drawback to taking courses via television is the inability to discuss complicated concepts in person or use diagrams and other visual aids in these outside-class discussions. Many students do, however, use facsimile transmissions to exchange notes and diagrams with their professors.

Students also use E-mail to correspond with teachers. Hill

(continued on page 50)

Musical chairs at the FCC

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ning staff for two years during the Carter administration, was a special assistant to Housing and Urban Development Secretary Joseph Califano and served on the staffs of former Sen. Adlai Stevenson III (D-Ill.) and Sen. Lloyd Bentsen (D-Texas).

Since 1981, Duggan has operated a consultancy, Ervin S. Duggan & Associates, in Bethesda, Md.

Charles Schott

Charles Schott, the new FCC chief of staff, came to the commission from the NTIA, where he served as Sikes' deputy. Before joining the NTIA in November 1986, Schott was chief of the Mass Media Bureau's Policy and Rules Division at the FCC.

Prior to his government service, Schott practiced corporate law and specialized in mergers and acquisitions for a New York law firm. In 1980, Schott was an adviser to the chief counsel of the Reagan-Bush campaign and served on the Reagan transition team.

Kenneth Robinson

A lawyer and former NTIA senior staffer, Robinson is the chairman's senior legal adviser, a role identical to the one he held at the NTIA. Robinson has served in the federal government for more than 20 years — at the Department of Justice, at the NTIA and now at the FCC. For most of his career, Robinson has focused on telecommunications/information industry policy issues.

Cheryl Tritt

Tritt, a lawyer, is the chairman's telecommunications adviser. She moved to the FCC from GTE Corp., where she was assistant vice-president for regulatory affairs in the Washington, D.C. office. Tritt is married to Phil Walker, a vice-president of Telenet Communications Corp., a subsidiary of US Sprint and United Telecommunications, Inc.

> A lawyer and former NTIA senior staffer, Robinson is the chairman's senior legal adviser.
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Tritt joined GTE in 1979 as a senior labor attorney and later as executive assistant to Ted Brophy when Brophy was GTE's chairman and chief executive officer. Prior to GTE, Tritt worked for the National Labor Relations Board in Chicago. She has also worked as a reporter in South Carolina and Missouri.

Lauren Belvin

Belvin left private law practice in Kansas City, Mo., to become Sikes' mass media adviser. Prior to entering private practice, Belvin held a number of positions with the FCC, including senior legal adviser to former FCC Chairman Mark Fowler and deputy general counsel.

Belvin also spent more than eight years in the former Cable Television Bureau as an attorney-adviser. She also served as general regulatory counsel for United Telecom-US Sprint.

> If Sikes succeeds, the RBHCs will win more business freedom, subject to regulation.
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Richard Firestone

Firestone, a close friend of Sikes, was chief counsel at the NTIA before going to the FCC. Firestone has what most FCC watchers consider to be the most important staff job: chief of the Common Carrier Bureau, which regulates the RBHCs, independent telephone companies, international carriers and AT&T.

Firestone joined NTIA in 1979 as program manager in the Office of Policy Analysis and Development and later served as the NTIA's deputy chief counsel and acting chief counsel. Prior to his federal experience, Firestone had been assistant attorney general, antitrust, in the office of the Ohio attorney general.

Robert Pettit

Pettit, the FCC's new general counsel, has had previous experience as a senior FCC staffer. From 1982 to 1986, he served as senior legal adviser to FCC Commissioner Mimi Weyforth Dawson, who, like Sikes, is a liberal Missouri Republican. Pettit also served as a staff attorney in the FCC's Broadcast Bureau, Renewal and Transfer Division and as a summer intern in the office of then Chairman Wiley.

When Commissioner Dawson was appointed deputy secretary of transportation, Pettit served as associate deputy secretary. He then joined the Bush transition team and served briefly as a partner with the law firm of Wiley, Rein & Fielding before returning to the commission.

Roy Stewart

A veteran of the FCC, where he began his career in 1965, Stewart has been named chief of the FCC's Mass Media Bureau. Previously, Stewart served as chief of the bureau's Video Services Division and chief of the Renewal and Transfer Division.

Linda Townsend Solheim

Solheim is director of the Office of Legislative Affairs, a key role because the FCC must improve its relations with Capitol Hill. Prior to joining the Sikes team, Solheim worked as counsel to the U.S. International Trade Commission, deputy general counsel of the Department of Commerce and chief counsel at the NTIA.

Lorrie Secrest

Secrest is the director of the FCC's Office of Public Affairs, which deals primarily with the press. Previously, she was a public affairs consultant with 15 years of media and public affairs experience, seven of them with the federal government. Her federal government career includes stints at the U.S. Information Agency, the Federal Trade Commission and the Federal Bureau of Investigation.

Prior to joining the government, Secrest worked as a reporter and producer for five years at Warner Amex QUBE Television in Columbus, Ohio. She also served as a public information officer in the county prosecutor's office and in the Ohio governor's office.

Andrew Fishel

Fishel is the new managing director of the FCC, where he will be mainly responsible for the internal management of the agency. From 1982, Fishel served as director of Financial and Resource Management Services in the Office of Management at the Equal Employment Opportunity Commission. From 1974 to 1982, he held various management and supervisory positions in the Department of Education and the Department of Health, Education and Welfare.

At the crossroads

Sikes now stands at a crossroads in public policy-making. If he succeeds, the RBHCs will win more business freedom, subject to regulation; the American public will move into the information age; and U.S. telecommunications/information technology will continue to lead the world. If he fails, the U.S. telecommunications network could fall behind those of Japan, Great Britain, West Germany and France.

Long-distance learning

continued from page 49

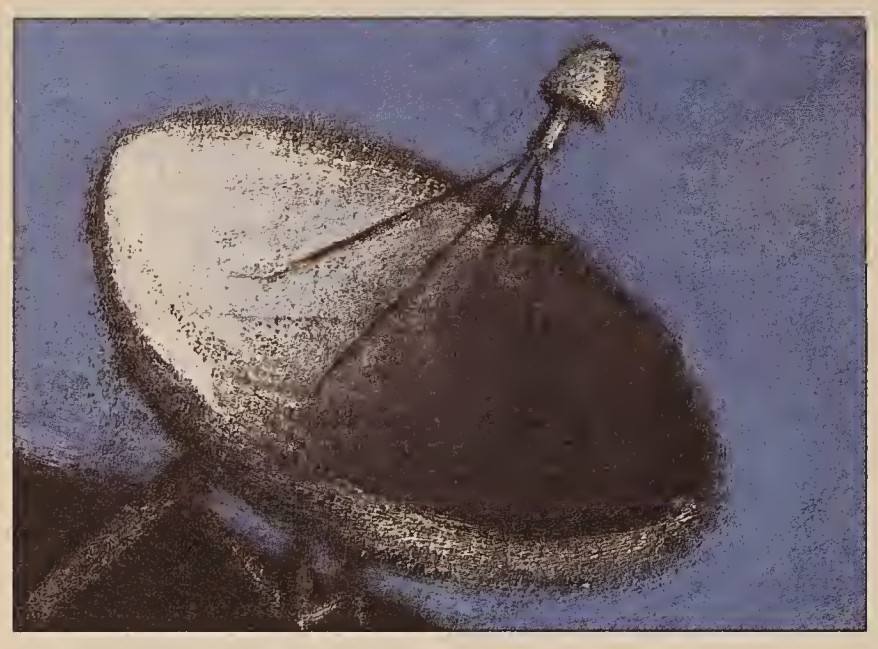
says he finds E-mail particularly useful for communicating with his remote students.

"I spend quite a bit of time answering calls, and it can be quite a burden," he explains.

Relevance to jobs

A major plus for NTU's program is the variety of courses from which students can choose to meet the requirements for each degree. Students say this allows them to take courses that are immediately relevant to their jobs.

That is one of the reasons Chuck Miller, manager of video instruction and learning resources for Rochester, N.Y.-based Eastman Kodak, says NTU delivers the best return on investment for the firm's graduate students.



A big plus for NTU's program is the variety of courses from which students can choose.

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"One of the things that stands out about NTU," Miller says, "is that engineers can select courses that are immediately applicable to [work] projects." Because Eastman Kodak has a variety of engineering and scientific personnel, the company is very concerned with continuing education and graduate education.

"Obsolescense is a real concern," Miller says. "It used to be [that engineers who didn't continue their education became obsolete in] five years; now it is more like six months to two years."

Miller says Eastman Kodak is so satisfied with NTU's engineering and computer science offerings that it would be pleased if NTU began offering chemistry and chemical engineering courses for its Eastman Chemical Co. employees.

However, he concedes that the lab work required in chemistry courses provides an obstacle to "distance learning."

In addition to participating in NTU's graduate and noncredit programs, Eastman Kodak picks up the cost of sending employees to the University of Rochester and Rochester Institute of Technology.

John Robinson, manager of external affairs at Motorola Corp. in Schaumberg, Ill., is another NTU booster. Robinson says he believes NTU's reputation is growing and its degrees are valued by high-tech employers. He points out that while a degree from NTU is accepted by employers in the same fashion as a degree from a more conventional university, the convenience and accessibility of its broadcast curriculum makes it unique.

The 50-plus corporations and government agencies that receive NTU programming at more than 240 sites pay a onetime fee ranging from $8,000 to more than $200,000, depending on the number of employees the organization has and how many sites receive NTU broadcasts. Graduate courses cost $405 per credit hour; the costs of noncredit technical and management programs vary.

A teacher's view

Speaking from a teacher's perspective, Hill of UMass is equally enthusiastic about participating in the NTU program. He says the NTU students tend to be more mature and, therefore, more serious and professionally experienced than his other graduate students.

Because UMass has an extensive instructional TV operation in addition to its involvement with NTU, Hill has a great deal of experience teaching before the camera.

The biggest adjustment, he says, was getting used to sitting at a desk and being photographed by an overhead camera rather than freely strolling about the room during his lectures. The classroom in which he conducts his televised classes has four television monitors, and many of the in-class students watch much of the lecture on TV.

Robinson believes NTU's reputation is growing and that its degrees are valued by employers.

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In Hill's case, the televised format makes it easier to demonstrate the computer graphics that are the subject of his lectures. He can speak directly to the control room from which the camera is directed and request that a shot of a particular graphic be shown on the in-class and remote TV screens.

Hill says his televised teaching requires no more preparation than his conventional classes. He adds, however, that some colleagues complain that they spend extra time preparing visuals for their televised classes.

Prestige and power

An important concern for graduate students is the relative prestige of the institution from which they receive their degree. In November, NTU became accredited by the Commission on Institutions of Higher Education of the North Central Association of Colleges and Schools, which also lists Colorado State University and the University of Colorado among institutions it accredits.

Because the school is so new, it has had little time to build a reputation. Its students say they understand that they are pioneers and believe that NTU's reputation is already growing.

Indeed, it may be fitting that engineers and computer scientists should pioneer a new way of providing higher education, one that takes advantage of progress in communications technology. After all, it is they who will play a central role in developing the even more advanced forms of communications that will further integrate voice, data and image technology.

Because NTU is so new, it has had little time to build a reputation.

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Users light a fire under leaders

continued from page 37

pertise must be freely available.

Everyone must have access to all of this, regardless of location, and subject only to the ability to pay. What users pay for services should be based on cost and competition, but they should be informed in advance of what the cost will be and be assured that the utility will always provide the lowest cost for the service level requested.

And let's not forget our grand old objective of universal service: to ensure that everyone is connected at a minimal level, regardless of their ability to pay. Finally, in light of our shrinking world, connectivity and services must apply worldwide — even solar-systemwide for astronauts.

The technology is in sight to accomplish these goals. What's lacking is the vision, the leadership and the will. And it's time to fix that.

Doing it

How do we do that? We, the users, should dictate and demand what we want in the future. We should do this as individuals, entrepreneurs, employees, consultants, public servants and educators.

Unfortunately, we are not very well organized to effect this change and never will be. Our only hope is our representatives in Congress. It's time for a national policy and a national consensus.

Maybe the executive branch can also help. If there can be Transportation and Labor Departments, perhaps there should be a Telematique Department. Let's get these lily-livered bureaucrats and legislators moving on something worthwhile and stop the parochial jousting between fly-by-night, quick-buck artists, lawyers, accountants and entrenched bureaucrats in the industry.

Let's cancel the Communications Act of 1934. Let's eliminate the state PUCs and the FCC and combine these functions into a new organization chartered with using open processes to bring U.S. telecommunications into the 21st century.

Let's nationalize the local loops, bring them up to modern standards, turn them over to the local exchange carriers and ensure that everyone has access free of charge. Let's eliminate cross-subsidies; if we're to subsidize something, do it openly and directly.

Let's limit local exchange carriers to serving access loops and local switching, and open that access to everyone and everything. Let's redraw local exchange carrier boundaries and make each a local company, serving only a community or metropolis.

Let's ensure that everyone is supplied with modern technology and services. If the investment to implement a useful service is too risky for an accountant's approval, let's find a way to get it done anyway.

We, the users, should dictate what we want in the future.

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Let's set up standards and architectures to ensure that devices and services from different companies will interoperate in an open environment. And let's monitor the industry to make sure we are always making progress toward our goals.

The future will come, but its character depends on what we do today. Let's do what's required now to create the future that we want.

People & Positions

continued from page 9

vice-president of manufacturing in 1979.

Charney will continue to represent 3Com on the board of directors of Madge Networks, Ltd., a U.K.-based token-ring vendor in which 3Com has a minority interest. He will not be replaced.

The Central Manufacturing Division will be absorbed into various 3Com divisions, including the Transmission Systems Division, which makes such products as adapter cards.

Mitel, Inc., a Boca Raton, Fla.-based private branch exchange maker, recently named **Michael Talley** vice-president of customer support.

In his new position, Talley will oversee all technical training and customer support engineering. He will report directly to **John Combs,** Mitel's president.

Previously, Talley was manager of service business development in IBM's National Service Division.

Prior to that, he held various positions at what was then IBM's Rolm Systems Division.

Delbert Yocam, one of **Apple Computer, Inc.**'s few remaining links to founders **Steven Jobs** and **Stephen Wozniak,** recently resigned from the company as expected, to pursue other unspecified interests.

Yocam, who had been head of Apple's Pacific Division, announced more than a year ago that he planned to leave the Cupertino, Calif.-based computer maker late this year.

He has been with Apple for 10 years.

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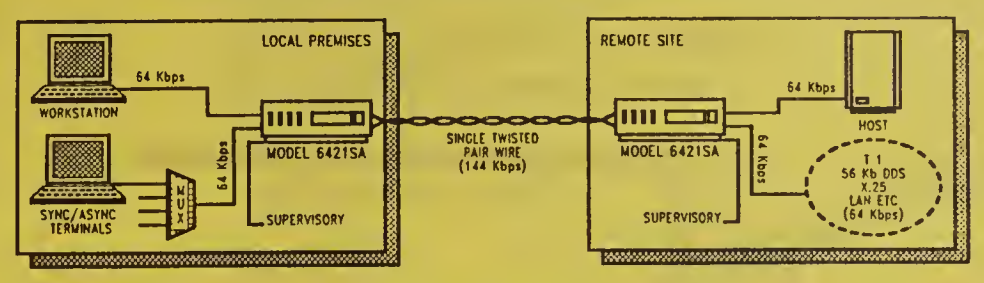

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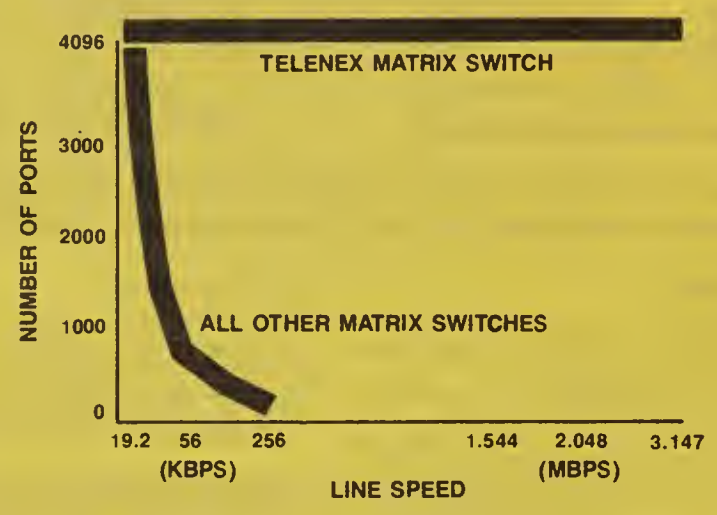

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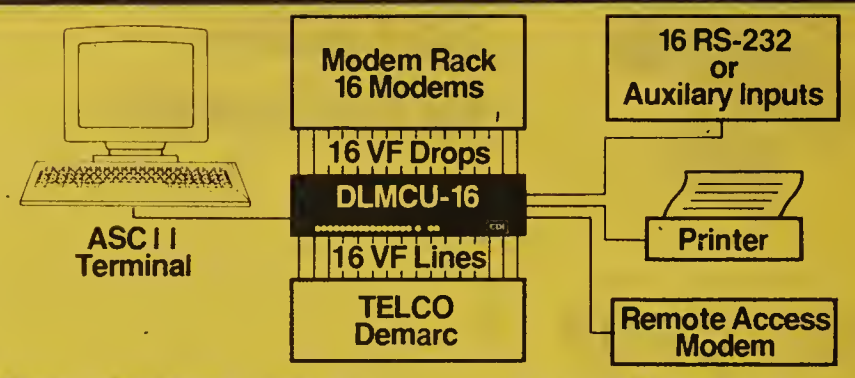

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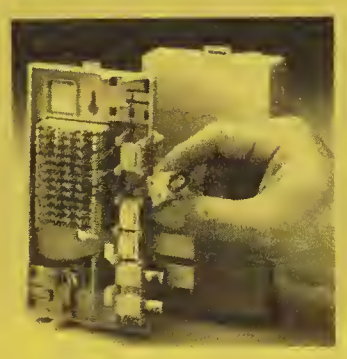

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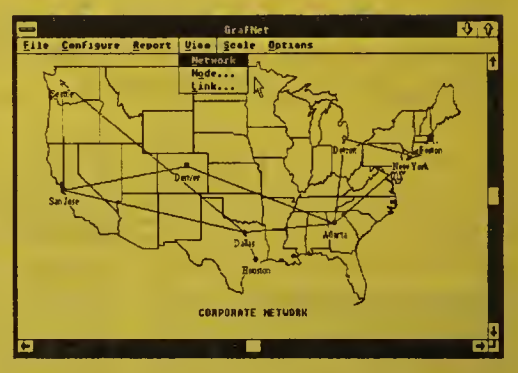

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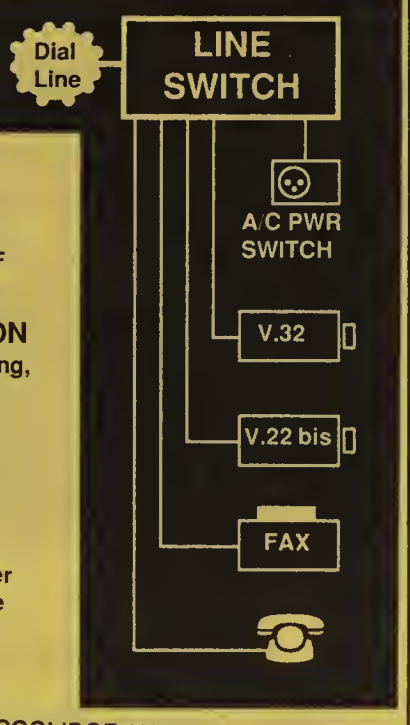

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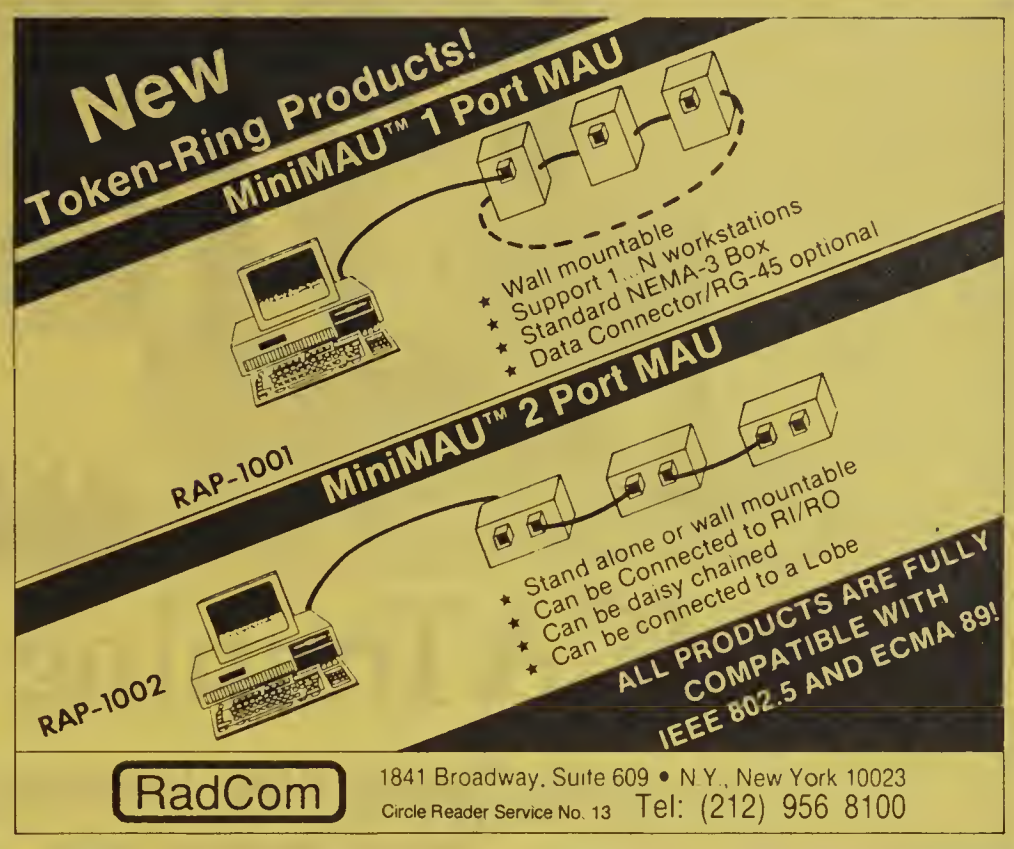

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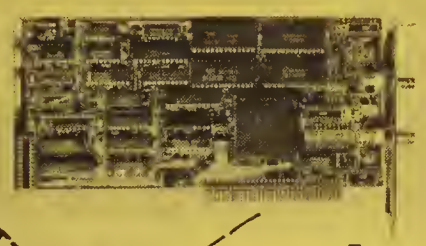

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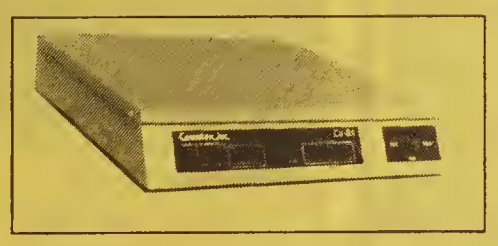

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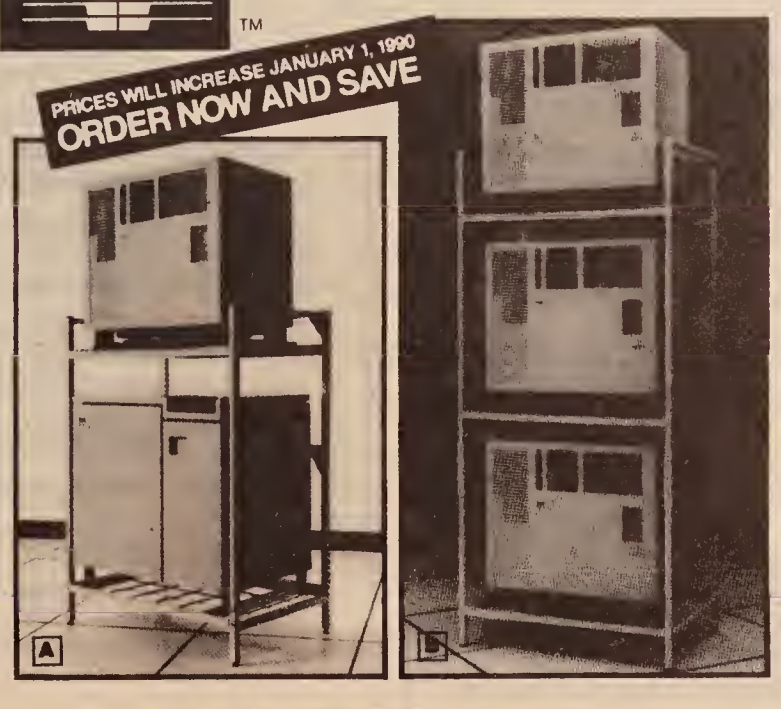

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Firms emphasize quality

continued from page 2

Codex Corp., a subsidiary of Motorola, Inc., is shooting for perfection in the manufacture of a variety of data communications equipment. Under a corporate program that earned Motorola the inaugural Malcolm Baldrige National Quality Award last year, Codex is aiming to achieve by the end of 1992 a level of quality called Six Sigma — a defect standard of 3.4 parts per million.

Codex is increasing the resources it is investing in improving quality by 200% a year in an effort to gain a strategic edge over competitors, said Rich Schroeder, Codex's vice-president of corporate quality assurance.

"Quality is a competitive area," Schroeder said. "Quality awareness is constantly rising among consumers."

Codex holds training sessions on quality awareness for employees and rewards them with bonuses for good quality practices, such as catching possible problems with products before they go out the door, he added.

The Canton, Mass.-based firm is also one of a growing list of vendors that require their suppliers to be sticklers about quality. Pacific Bell, for example, awards suppliers that exhibit exceptional attention to quality.

"The program is designed to provide better service to our customers by having the pieces that make up our telecommunications network be of top quality," said Larry Shields, the carrier's quality assurance manager.

One of the areas where quality can and is being improved dramatically is in service, according to Jeff Kaplan, a principal at The Ledgeway Group, a Lexington, Mass.-based market research firm. Responsiveness and accessibility are the key characteristics to look for here, he said.

One company that has a strong service quality program is Network Equipment Technologies, Inc. (NET), a Redwood City, Calif.-based T-1 multiplexer maker, Kaplan said. NET's dedication to quality earned it a chapter in a recently released book titled *Total Customer Service: The Ultimate Weapon.*

Bob Krueger, NET's director of quality assurance and technical support, said a major reason for NET's success is that its 30-person corporate quality assurance department reports to a service vice-president rather than a manufacturing vice-president. NET spends about 2% of its revenue on quality programs, he said.

Judging quality

Fortunately, the quality commitment of leading vendors in mature markets, such as the private branch exchange industry, is typically high, said Barry Gilbert, a principal at TFS, Inc., a Westwood, Mass.-based market research firm. Differences in quality commitment are more perceptible among start-up companies pursuing emerging technologies, he said.

Users said the best way to judge a vendor's commitment to quality is to talk to their customers who have similar network needs and are in the same geographical region. But when it comes to emerging technologies, such as Fiber Distributed Data Interface products, finding existing users is tough, said Kean College's Costanzo. In such cases, Costanzo said he seeks advice from other vendors.

According to John Condon, president of the American Society for Quality Control, a group of professionals dedicated to the advancement of quality, users have to ask vendors the right questions about quality before they buy. He suggested focusing on the Baldrige Award criteria and asking company quality experts to review potential suppliers' offerings.

How to measure commitment to quality

- Senior management support of quality programs
- Information systems used in the management, evaluation and planning of quality
- Integration of quality improvement planning into overall business planning
- Involvement of all employees in the quality support process
- A systematic approach to total quality control of goods and services
- Quality improvement results based upon objective measures
- Knowledge of the customer

SOURCE: THE MALCOLM BALDRIGE NATIONAL QUALITY AWARD CONSORTIUM, INC., MILWAUKEE

Competition spurs U.S. companies' quality push

MILWAUKEE — Senior executives are becoming increasingly aware of the significance of providing quality goods and services, according to a recent survey conducted for the American Society for Quality Control.

The survey was conducted by The Gallup Organization among a cross section of executives from Fortune 1,000 companies.

About 72% of respondents said the need to increase quality is being spurred by competition with other U.S. firms, up from 54% the year before.

A majority of respondents also said they think the U.S. is gaining on its foreign competitors in terms of quality. The number saying the impetus to increase quality is coming from competition with Japanese firms dropped from 22% in 1988 to 9% this year.

Quality is considered an important buffer against a potential recession, the executives said. About 73% of respondents said the quality leader in an industry is less vulnerable to a recession than its competitors.

Keys to a successful quality program include getting everyone from top management on down to pay consistent attention to quality, executives said.

On the negative side, the current wave of mergers and buyouts is seen as a possible setback to American companies' quality programs. This could be an area of significant concern in the network industry, where mergers and acquisitions have become commonplace in the past few years.

Such transactions often ramp up debt and limit spending on quality assurance programs, the executives said. About 69% of respondents said mergers and buyouts have a negative effect on quality in the short term, and 49% said the effect remains over the long term. Nearly a third of respondents said they have noticed the effects of takeovers on quality in their firms.

— Bob Brown

Robert Clark, vice-president of the product evaluation group at Infonetics, Inc., a Santa Clara, Calif.-based market research and testing lab, said a recent report conducted by his firm showed that local-area network managers should be particularly quality-conscious "if they equate quality with reliability."

The report found that LAN downtime cost users an average of $3.5 million in lost productivity and more than $600,000 in lost revenue annually ("Local net downtime costs users millions, study says," *NW,* Sept. 11).

RBHCs to end strategic pricing

continued from page 1

has been that they "don't care about cost, [they] are obscenely pricing tariffs because that's what [they] want to do for strategic reasons," Moir said. "The carriers have been taking advantage of the business user community."

ICA has fought both at the FCC and in the courts to force the local carriers to base prices on the cost of providing service.

Changing conditions

FCC officials last week pointed to changing market conditions as explanation for the policy turnaround. For example, Richard Firestone, chief of the FCC's Common Carrier Bureau, said the amount long-distance carriers pay for switched access has dropped from $10.48 to $2.83 over the last five years. That change has brought down the price of switched long-distance services and has reduced the incentive for large customers to migrate to private-line services.

In the future, local carriers will have to show an extraordinary reason why prices should be based on factors other than cost, Firestone said.

The FCC said strategically priced special-access tariffs have resulted in inflated prices and ordered six of the RBHCs and one independent carrier to make refunds that could total $75 million. They are: Ameritech, Bell Atlantic Corp., BellSouth Corp., Pacific Telesis Group, Southwestern Bell Corp., US West, Inc. and Cincinnati Bell, Inc.

How much money will actually be refunded won't be known until the local carriers submit reports outlining how the access charges were figured. A source at the FCC said it is not likely users will receive the full $75 million.

He said some of the overcharges could be due to factors other than strategic pricing, such as overestimated cost projections or underestimated demand projections. Refunds will be ordered only on the overcharges directly attributable to strategic pricing.

The FCC was also unwilling to specify how much of the money would be refunded to long-distance carriers and how much would go directly to users. Moir said he expects carriers to handle refunds through lower rates.

A spokeswoman at AT&T said it was unclear how much money the carrier could receive and whether AT&T would reduce its rates. She added that if the refund is small, it might not be feasible for AT&T to lower rates.

Refunds in January?

Moir predicts customers might get refunds as early as January. But a source at the FCC said it is likely that someone will challenge the FCC's decision, a move that would slow refunds.

The RBHCs declined to comment in detail on the FCC ruling, but spokesmen for several of the companies refused to rule out the possibility of a legal challenge.

Although Moir said he is pleased that the FCC is reinforcing the principle of cost-based pricing, he said ICA still has concerns about special-access pricing. In determining whether access charges accurately reflect costs, the FCC uses a so-called crossover point — the point at which it would be more economical for users to migrate from switched to private-line services.

In the case of T-1 lines, the FCC determined that the crossover point should be between four and eight switched voice circuits, a level Moir said may be too high. That means private-line rates are too high as a result.

If RBHC special-access prices translate into a higher crossover point, the carrier must present extensive cost-support data to justify the higher rates. However, Moir said that based on the current cost data the RBHCs submit with tariffs, it is virtually impossible to determine what crossover point is appropriate.

VSATs help automakers

continued from page 4

any dealer and be assured that they have a complete maintenance history of the car, regardless of how many people have owned it or how many dealers have serviced it.

Although such an application could just as easily be provided over terrestrial lines, Toyota opted for a VSAT net because it was less expensive, faster to roll out and easier to manage, Sittel said.

VSAT alternatives

For some automakers, VSATs are replacing multidrop leased-line networks. The problem with those networks, besides their expense, is they must be reengineered each time a new dealer comes on or drops off the network. "Dealerships tend to come and go," said Mike Hadfield, network data processing specialist for Nissan.

Nissan is installing a shared-hub VSAT network to support dealers of its new Infiniti luxury car line ("Nissan builds VSAT net to support Infiniti car launch," *NW,* Oct. 16). The net was launched with VSATs at 50 dealer sites and will grow to 200 Infiniti locations, some of which are as yet unknown, before expanding to Nissan sites.

Hadfield explained that it can cost thousands of dollars in telephone company charges to add or drop a site from a multidrop network — an expense that is not a factor with VSATs. Also, the phone company needs about 60 days lead time before installing multidrop lines, whereas VSATs only require city permits, which take an average of three weeks to acquire, he said.

Another VSAT option is value-added net providers such as BT Tymnet, Inc. which Nissan currently uses for all but its Infiniti dealers. Such nets solved the engineering problem but are costly for lengthy interactive communications, Hadfield said.

HP extends NewWave

continued from page 1

However, HP is faced with the difficult task of educating customers about the revolutionary environment.

"NewWave Office represents a conceptual challenge for users," Palermo said.

NewWave includes client and server software components. On the server side, the NewWave Office program suite provides a group of services for local-area network-attached workstation clients, including electronic mail (with links to X.400 and IBM's Professional Office System and DISOSS), resource sharing, data access services and network management facilities.

These services are available for three operating system environments, including MVE, HP's minicomputer operation system; HP-UX, HP's version of Unix; and OS/2.

On the client side, is the existing NewWave package that runs on Microsoft Windows. In the future it will run over OS/2 Presentation Manager as well. These graphical user interfaces will be all the user sees, giving applications the same look and feel and making it easier for users to learn new programs.

Just as important are the task automation and object management facilities in NewWave, which can be used to build an object — displayed as an icon on a user's personal computer — that represents combinations of applications and data files located on different systems.

One object, for example, might be a weekly report based on a Lotus Development Corp. Lotus 1-2-3 spreadsheet, which is updated by downloading data from a mainframe. The object is created by doing everything manually the first time.

A NewWave agent records each step used to create the report as a series of macroinstructions that automate the process. The next time an updated report is needed, the user just clicks on the report icon, and the agent takes care of everything else.

Once an object has been created, the user doesn't have to know anything about the various computers and networks behind the interface.

"The object orientation of NewWave gives end users the capability to integrate applications themselves," Palermo said. The integration can be particularly successful if the applications have been developed for, or adapted to, the NewWave environment.

For one thing, NewWave-specific applications support dynamic links between objects. Data incorporated into a report object, for example, is automatically updated if the spreadsheet that data was derived from is changed.

Microsoft has promised a NewWave version of its popular Excel spreadsheet, but it stands alone among the major software companies. However, a number of smaller developers have announced interesting products.

Da Vinci Systems, Inc. of Raleigh, N.C., is developing a LAN-based E-mail package for NewWave.

"You'll be able to create a document in some NewWave application and just drop it on the E-mail icon to mail it," said Chris Evans, vice-president of marketing for Da Vinci Systems.

A LAN-to-mainframe link, called DynaComm, is being built for NewWave by FutureSoft Engineering, Inc. of Houston. To send a document to the mainframe, a user takes the document icon and lays it on the mainframe icon. The DynaComm agent then establishes the mainframe session and translates the document into the appropriate format.

Existing character- or Windows-based DOS applications can be represented as objects in the NewWave environment or invoked as part of a NewWave object, but they cannot be dynamically linked to other applications; data generated by them has to be cut and pasted into other applications and vice versa.

Still, the ability to plug old applications into the NewWave Office framework is seen as a major competitive advantage for HP.

"Unlike IBM's OfficeVision and DEC's All-In-1, HP's NewWave Office is extremely open," Evans said. "You can drop your products into place and be a part of NewWave Office."

John Logan, vice-president of The Aberdeen Group, a Boston-based market research firm, said this makes NewWave Office "almost revolutionary" among office automation systems.

N.Y. widens local access options

continued from page 1

enue remains constant (see "Price hike permitted after carrier opens competition," page 2).

Officials with Teleport Communications Group, Inc., based here, said the tariff will, for the first time, enable the company to sell dedicated access to New York Telephone central offices in direct competition with the Bell operating company. The officials said they believe that this arrangement could be a model for increasing local loop competition across the country.

"This is a monumental decision, which could be used to open the door for alternative carriers in large cities everywhere," said Robert Atkinson, Teleport's senior vice-president for regulatory and external affairs.

Teleport's private fiber-optic network is used primarily by large corporations for high-capacity, dedicated links to other city locations and to access various long-haul carriers' points of presence.

Teleport also leases circuits from New York Telephone to dump traffic into the local exchange.

For years, Teleport has sought permission to collocate its multiplexing equipment at New York Telephone switch facilities so it could build dedicated links into the carrier's net, but the carrier repeatedly denied the requests.

Last week's ruling reversed that stance. Approval to run its own cable into New York Telephone facilities, along with promises from New York Telephone to support the circuit with Teleport-compatible equipment, will provide what the New York State PSC calls "the economic and technical" equivalent of collocation, or "virtual collocation."

Under the OTIS tariff, users and alternative carriers will be able to access New York Telephone's central offices via fiber-optic links at 135M, 405M or 560M bit/sec. OTIS subscribers will own all the fiber to within a few feet of the New York Telephone central office. New York Telephone will own and maintain the last few feet of the cable and will be responsible for supporting the equipment on its end.

Although the tariff does not stipulate that New York Telephone has to install terminating equipment that is compatible with the alternative carriers' network, Teleport's Atkinson said the carrier assured him it would meet his company's needs.

Atkinson said support of this equipment is "absolutely essential to making sure we can do the kind of network monitoring and control we'd need to sell a competitive service."

Local access competitors

Armed with this interconnection, Atkinson said Teleport will, for the first time, be able to sell

> "This decision could be used to open the door for alternative carriers everywhere."
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such things as dedicated 56K bit/sec and T-1 links into central offices in competition with New York Telephone. Theoretically, Teleport could have sold these services before by leasing T-3 circuits, but Atkinson said that was not economical.

"We need the bigger pipe under our control to be able to sell these services at a price that would be competitive with New York Telephone," he said.

Atkinson said that, to his knowledge, this is the first time a carrier has been ordered by regulators to support virtual collocation.

He noted that New Jersey Bell Telephone Co. willingly agreed to a similar arrangement with Teleport in 1986. Now, Teleport plans to ask for virtual collocation arrangements in other cities where it is building alternative local-access networks, such as Boston, he said.

Prices for OTIS interconnections, which are available now, range from a monthly charge of $1,444 for a 135M bit/sec circuit supported by an NEC Corp. switch to $5,108 per month for 560M bit/sec circuit supported by Rockwell International Corp. equipment. Various nonrecurring charges will also be included.

University builds net foundation

continued from page 1

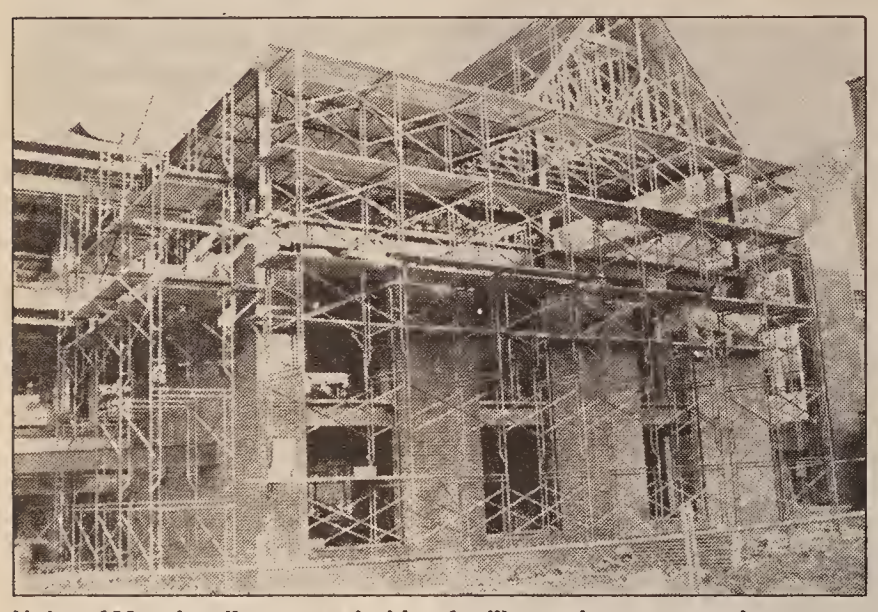
The project calls for the construction of a fiber-optic data network linking more than 200 campus buildings. About 12,000 offices are being rewired to support 10M bit/sec Ethernet over both fiber and twisted-pair wiring.

Initially, the data net will enable about 4,000 workstation users to exchange information and access applications running on eight mainframes in two campus computing centers, Rood said.

Voice net in works

The school is also building a voice network that will be supported by an AT&T Definity/Generic 2 switch, which will be housed in a $3 million switching facility now under construction. The school is installing twisted-pair wire that will run from the switching center to every building in the campus through 10 miles of new underground conduits, which will carry 30 miles of copper, coaxial and fiber wiring.

Coaxial cable laid between about 500 lecture halls and conference rooms will support one-way and two-way video communications. The network will support distribution of video programming from the university's media center and will provide access to three university-owned satellite dishes for the distribution of off-site television programming.



Univ. of Maryland's new switching facility under construction.

Last February, the university awarded AT&T a $32 million contract to provide equipment and cabling, and serve as the prime contractor for the network overhaul. The contract is the largest AT&T has signed for its Premises Distribution System for underground and inside wiring, according to Michael Roney, AT&T's chief project manager at the site.

It is also one of the five largest single-site installations AT&T has ever managed, Roney said.

To pay for the project, the university received $5 million in a lump-sum grant from the state of the Maryland, and AT&T is financing the rest on a 15-year payback plan.

While the price of installing a state-of-the-art net isn't cheap, Rood believes the project will eventually save the university hundreds of thousands of dollars.

"We could have built the network piecemeal, adding capabilities as demand arose," Rood said. "But by paying extra now, we avoid the cost of installing new fiber later or purchasing equipment that users will someday want, such as digital phones."

The network overhaul would not have been possible without support from senior administrators, Rood said. For the past three years, the project has been guided by a task force consisting of many top university officials, including the current president, William Kirwan.

A fiber data backbone will connect six hubs spread across the 1,300-acre campus. These hubs — intelligent routers supplied by AT&T — will link nearby campus buildings to the backbone via fiber circuits. The backbone will initially support speeds of 80M bit/sec and use the Internet Protocol.

Underground cable conduits will carry 30 miles of new wiring.

Fiber circuits will extend to wiring closets on each floor of every building. From there, fiber and twisted-pair strands will run to separate outlets in each office. A third outlet will support twisted-pair connections for voice.

Besides providing any-to-any connectivity on campus, the data network will give users access to national research nets, including the National Science Foundation's NSFnet and the Advanced Research Projects Agency Network. The network will also let users transmit to other outside locations via a bank of modems tied into the campus' voice network at the central switching facility.

While all offices will be equipped with fiber, initially only 600 users will be able to tap into the fiber network. Fiber outlets in the remaining offices will be made available as users request it, Rood said.

Foolhardy for fiber

"Some may think we're being foolhardy or crazy to install fiber to 12,000 offices, but we think it gives us the opportunity to take advantage of important future technologies, such as FDDI, without much difficulty," he said.

Besides revamping the data net, the university task force decided to replace its current Centrex system with a Definity 2 to gain more control of its communications facilities, Rood said. The new phone system also supports advanced features such as automatic redial and distinctive ringing, and supports automatic least-cost routing of calls.

Jonathan Rood

The school is also installing AT&T's Audix voice-messaging system.

Rather than renovating an old basement in some corner of the campus to house the new switch, the task force decided to build a completely new switching facility. To determine the best design for the building, the university's communications staff visited switching facilities at 15 other locations. The result is a highly secure, state-of-the-art facility that not only houses the AT&T switch, but provides offices for network administrators, technicians and phone operators, Rood said.

U. of Calif., DEC to build OSI net

continued from page 2

will make the university a Phase V user before it becomes generally available in the fall of 1990, said Michael Greene, DEC's networks program manager for education industry marketing.

The Phase V network will support OSI connectionless transport protocols and application-layer services, such as X.400-based electronic mail, Virtual Terminal Service remote logon, and File Transfer, Access & Management (FTAM), Greene said.

The net will also give the school a chance to experiment with the OSI-based addressing scheme of DECnet Phase V, which will become increasingly important as academic networks around the globe start migrating to OSI, said Clifford Lynch, director of library automation at the school's Office of the President.

The Phase V net will link users at four sites: the Office of the President and university campuses in Berkeley, Irvine and Riverside, Calif.

The Berkeley campus was included because programmers there are developing a new version of Unix that will include a full OSI protocol stack. The network will give the developers a transport to test the new Unix version, West said.

The OSI network will be supported over the existing T-1 backbone that already supports SNA and TCP/IP.

The SNA net supports administrative applications, while the TCP/IP net supports links to the school's two major computing resources: a central data base of each campus's library holdings and the supercomputer center here, which is part of the National Science Foundation network.

But at the university's Irvine and Riverside sites, there are large numbers of DEC VMS users who today are forced to communicate with the other campuses via gateways to outside federal networks that support DECnet.

The university rejected the idea of accommodating those users by integrating support for the current version of DECnet into its backbones, West said.

"We didn't want to keep proliferating different environments," he said. "The challenge we gave Digital was to show how OSI could be implemented now to help us achieve a compatible environment without going to yet a third platform."

Lynch said the school is initially seeking only to gain practical experience in using OSI; the migration of TCP/IP and SNA to OSI is a long-term goal.

X.400 will be the first application tested over the network, said DEC's Greene. "A lot of vendors support X.400 E-mail products," he said. "We want to see if they'll all talk to one another."

West said the network should be running by mid-1990.

Price hike permitted

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alog to digital services. A carrier in a competitive environment could never treat customers like this."

Users were also upset with a September New York Telephone proposal to increase access charges for voice-grade circuits, decrease off-hour calling discounts and increase rates on metered calls to raise an additional $359 million in revenue.

Carrier officials said these changes are needed to compensate for an expected $367 million revenue shortfall when ownership of customer premises wiring is turned over to New York residents next January.

"It's absolutely outrageous that they would ask for this," said Chester Bellairs Jr., president of the Massapequa, N.Y.-based consultancy Kingsley Associates.

Users say New York Telephone has already recovered the cost of this wiring. The New York Public Service Commission has yet to rule on the request.

Some users expressed concern that New York Telephone may use the pricing flexibility it received last week to subsidize competitive services with revenue from noncompetitive offerings.

"Our concern is that prices are dropping where the most potential for competition exists and increasing where competition is pretty much nonexistent," said Randy May, an attorney with the Washington, D.C. law firm Bishop, Cook, Purcell and Reynolds, which is representing American Express Co., CBS and NBC in legal filings on the tariff changes.

New York Telephone officials denied the allegation and said that the changes simply make prices more accurately reflect the cost of providing service.

The price changes approved generally include lower prices for local T-1 circuits and dedicated analog circuits running between central offices, and higher prices for dedicated voice circuits and analog lines running into only one central office. They take effect next February and only affect users in the greater metropolitan area here.

Many users complained that these price changes and the $359 million revenue request represent yet another example of how local carriers unfairly manipulate pricing.

"It's pretty simple. Competition makes people more efficient, and there's more competition in the interexchange than in the local exchange," said Stanley Welland, manager of corporate telecommunications at General Electric Co.

Unforeseen problems that can put the bite on your network

Lessons for standards makers

BY TOM GOLWAY

So you want to be a standards maker? Here are some lessons to learn before jumping in.

One day, about four years ago, I flew to Washington, D.C. to attend a meeting of the Computer and Business Equipment Manufacturers Association (CBEMA). I arrived with plenty of time to spare and took a cab to the hotel where the meeting was to be held, figuring I'd easily be on time — maybe even early. Besides, I told myself, this is a technical committee; everyone knows that technical people never show up on time.

When I walked into the meeting room, I was surprised to find it full of people. "Am I late?" I thought. I checked my watch; it was exactly 8:30 a.m., the time at which the meeting was scheduled to start.

The room became quiet; all eyes focused on me. Finally, someone spoke: "Are you Tom?" I said yes and asked if I was late. "No," he answered. "But most of us got here about 10 minutes ago."

Lesson No. 1: It seems everyone in these committees arrives 10 to 15 minutes early. Even if you show up on time, you will appear to be late — and being late is not looked upon favorably.

As I looked around the room, I saw a mixed bag of about 10 to 15 people. I sat next to a man wearing a blue suit and wondered if its color bespoke the company for which he worked. By contrast, the man sitting in front of me looked like he was dressed for a square dance.

One by one, we introduced ourselves to the group and gave a brief synopsis of our professional backgrounds. No one really stood out, which made me feel confident. After all, as a communications consultant, I make a living implementing these standards. Most of the people here are paper pushers, I thought; I should make a big impression.

Since this was only the second meeting of this new committee, we were fortunate to have a representative from CBEMA to present the rules by which we were to work. She gave an excellent presentation and handed out two very large manuals with more details. "Typical bureaucratic paperwork, not worth reading," I decided, putting the volumes aside.

At the first break of the morning, we all gathered near the coffee cart outside the conference room. I found myself getting a lot of attention; all the people from the vendor companies seem to be very interested in me and a couple of the other users. It was like being confronted by a political candidate a few days before a big election.

Lesson No. 2: Never underestimate the political overtones of a standards committee. The people sent to the committees are there to protect the investment of their companies, and the companies generally choose people who are very loyal and highly competent. At break time, everyone looks for allies.

After the break, we got down to business with a discussion on a particular part of an upper layer Open Systems Interconnection standard. I wanted to see where the discussion was headed before I jumped in. But before I could say anything, the discussion was going fast and getting very complicated. People were coming up with scenarios that I never would have thought possible. I was getting lost!

Lesson No. 3: If you think you know everything about a particular standards-related subject, wait until you attend a standards committee meeting. And don't judge others based on first impressions; my initial instincts about some of my fellow attendees were very wrong. In fact, two of the most impressive people were Mr. Blue Suit and Mr. Square Dance.

The first day finally drew to a close. Just before the meeting adjourned, I received even more paperwork to look at that night in the hotel room. "It's probably nothing important," I thought. I gave it a cursory glance as I relaxed in my hotel room that evening and then went to bed early.

Golway is head of Enterprise Network Architects, a New York-based company specializing in enterprise network consulting.

The next day I arrived at the meeting room bright and early. I decided I would propose at least one idea to the committee before the end of the day.

We started the day by reviewing the work that some of the attendees did the previous night. "Was there a meeting last night that I didn't know about?" I asked myself. No, but over dinner some members had done some brainstorming, then they continued working into the evening. It was not even 9:00 a.m. and already I was behind!

Lesson No. 4: When you are away at a committee meeting, spend time with your colleagues. Try to stay at the same hotel and eat lunch or dinner with them. These people take standards very seriously and work very hard at them. You may get to know some interesting people and have some fun besides.

By break time, I had finally caught on to what they did last night. I decided to propose my idea after the break. Since I wanted this to be my motion alone, during the break I didn't talk about it with any of the other attendees.

After the break, I read my motion. When I finished, there was silence. Then someone asked, "Didn't you read Document 2 from yesterday? That report makes it obvious that your proposal will not work." Quickly, I denied having seen that document, even though last night, as I glanced through the reading material in my hotel room, I had dismissed that report as insignificant.

Lesson No. 5: Read closely everything that is given to you. Standards committee members do not generate paper that is not relevant to the current discussions. There is an understanding in committee meetings not to waste time on issues that are not within the scope of the committee's work. People who believe that committees drag their feet on standards issues either have never seriously participated in a committee activity or don't understand the need for careful discussion of items that will affect the industry for many years.

Here are some other important tips for learning the standards game:

- Never support any motion you have previously opposed, unless its proponents compromise toward your position. Flip-flopping between opinions indicates indecisiveness and lessens the impact of your future opinions. Remember who you have supported in the past, who has helped you and, most importantly, who you have vocally opposed; sometimes you may bruise an ego.
- Latch onto someone who has experience in committees, usually someone from one of the bigger companies. The relationship will be very beneficial for you.
- Always bring up noncontroversial items right before the end of the day. They will probably be passed.
- Similarly, always bring up the relatively controversial motions right before the break and use the breaks to lobby for your proposal and adjust it based on any objections. This makes you look flexible but not wimpy.
- Anything very controversial requires one or more allies. Use the breaks to lobby prior to submitting the motion and seek out some allies. Make the motion whenever you are most alert because you will probably be in for a tough battle. Always anticipate as many questions and objections as possible; this way you can immediately address those issues before they become fatal.

One of the most important things working on a standards committee will teach you is the importance of standards. Before working on these committees, you may feel that you know everything about available protocols and formats. Like me, you may find out that you still have a lot to learn.

IT'S HARD TO DRAIN THE SWAMP when those reptiles keep getting in the way. If you have a network "alligator story" to share with *Network World* readers, call Steve Moore, features editor, at (508) 820-2543, ext. 732, or fax your idea to (508) 879-3167.

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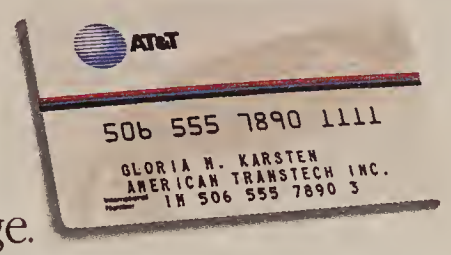

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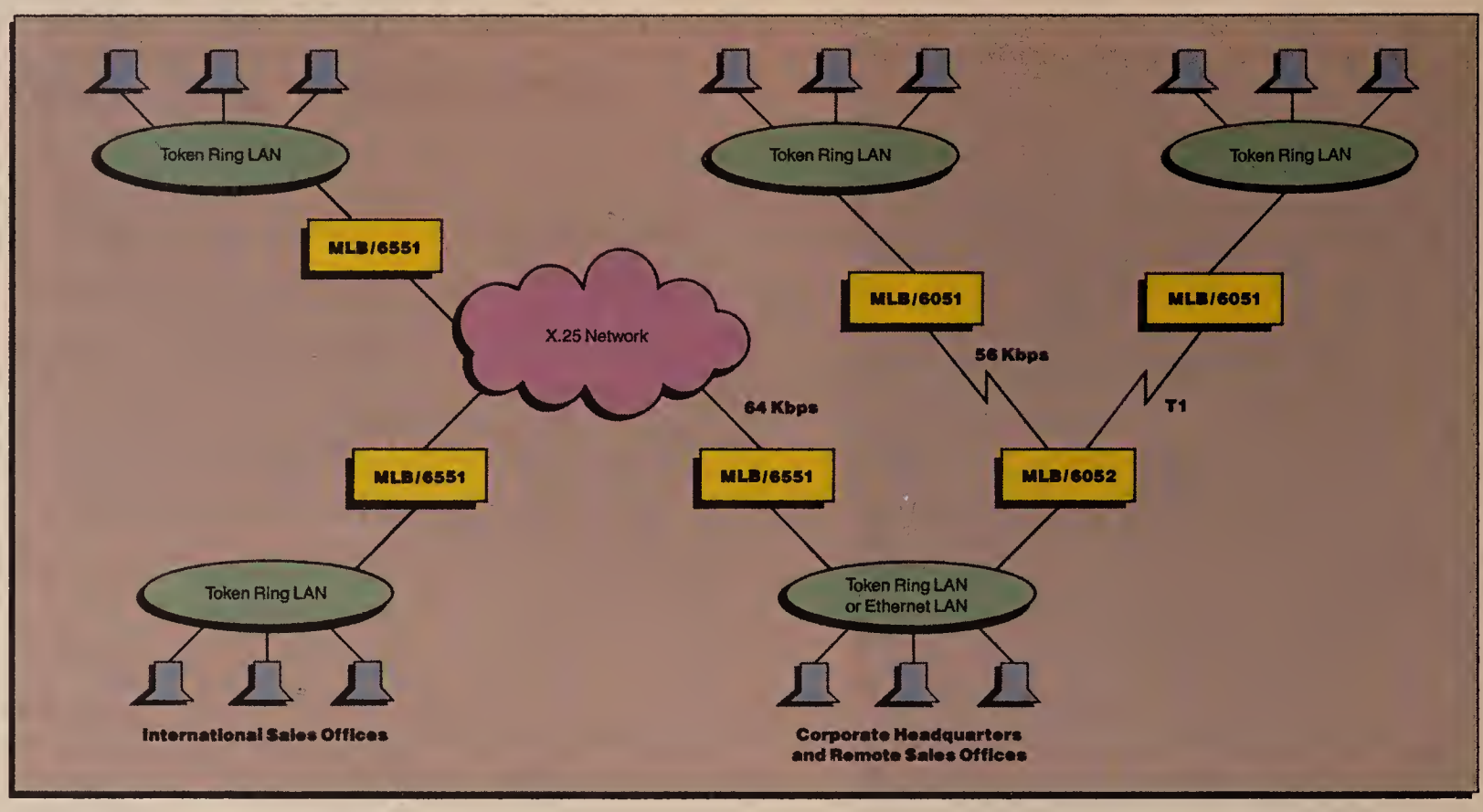

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